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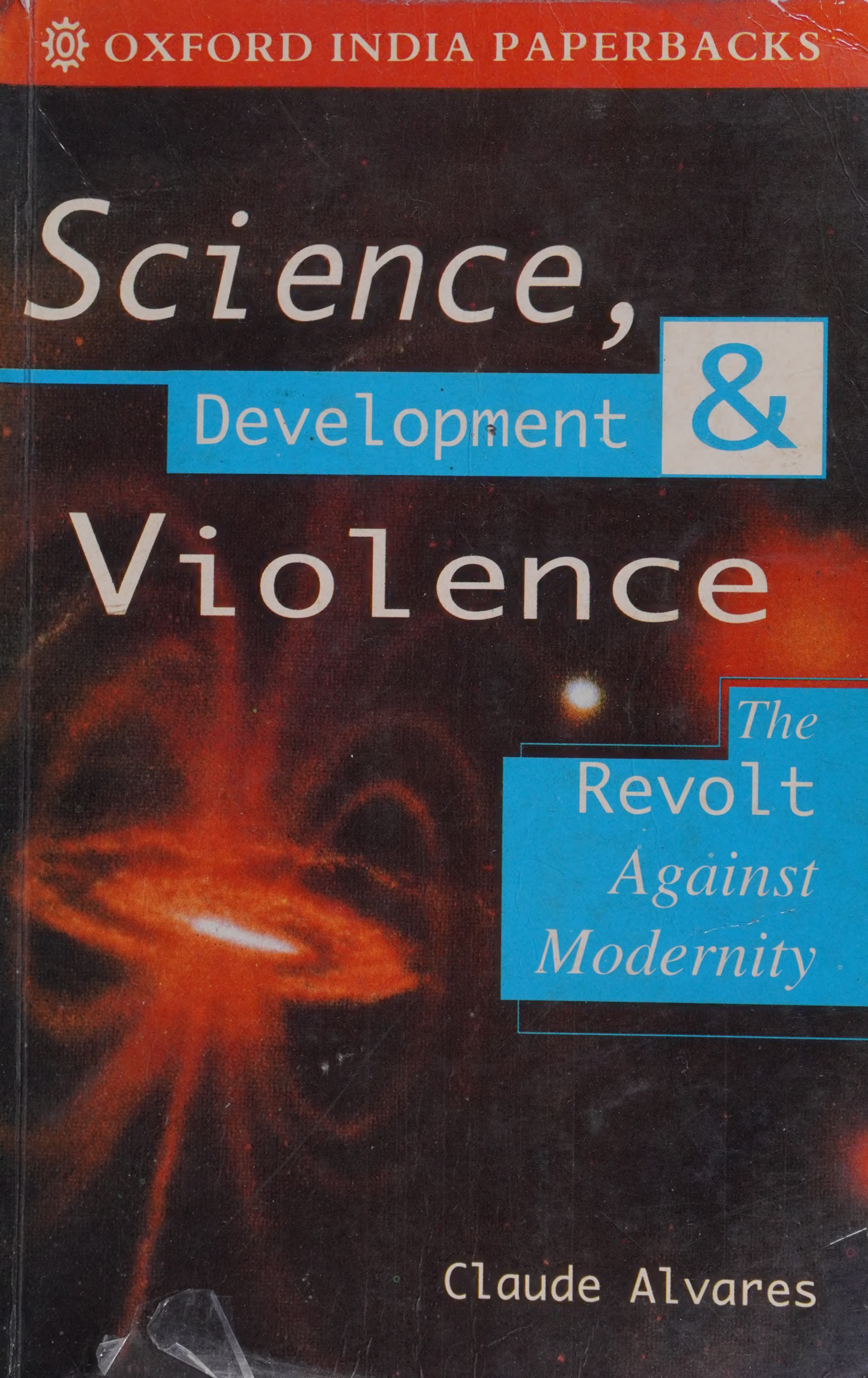
Science, Development & Violence

The Revolt Against Modernity



Claude Alvares

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SCIENCE, DEVELOPMENT AND VIOLENCE

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The Revolt against Modernity

CLAUDE ALVARES

DELHI
OXFORD UNIVERSITY PRESS
BOMBAY CALCUTTA MADRAS
1994

Oxford University Press, Walton Street, Oxford OX2 6DP

Oxford New York
Athens Auckland Bangkok Bombay
Calcutta Cape Town Dar es Salaam Delhi
Florence Hong Kong Istanbul Karachi
Kuala Lumpur Madras Madrid Melbourne
Mexico City Nairobi Paris Singapore
Taipei Tokyo Toronto

and associates in
Berlin Ibadan

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and Global Futures, Delhi, 1992

First published 1992
Oxford India Paperbacks 1994

ISBN 0 19 563281 8

Printed at Rekha Printers Pvt. Ltd., New Delhi 110020
and published by Neil O'Brien, Oxford University Press,
YMCA Library Building, Jai Singh Road, New Delhi 110001

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Preface

'The experiment is over, development is dead.' These words summarize the principal theme of this book. They were provided by a Mexican writer, Gustavo Esteva, in an extraordinary essay, entitled *Regenerating People's Space*, published in the journal *Alternatives* in January 1987. I discovered the essay just as the final editing of this book had commenced. Esteva had drawn my attention to the essay when responding to an article I had written for *Development Forum*.

After writing *Homo Faber*, I had settled down in a village in Goa eager to exploit whatever talents I presumed I possessed in the cause of 'rural development'. However, I soon found that these 'talents' were of little use to the rural community. I had consequently to re-learn life all over again.

This was neither unpleasant nor miserable, since, like Esteva, I had also de-professionalized myself, refusing to be associated with any formal academic establishment or institution, this being my own version of a subsistence lifestyle. Over the past decade, I have come to know a little about life husbandry, though not enough I confess to live totally by the difficult art of subsistence.

I continued writing on development issues, much of it influenced by my everyday experiences of village life. Encouraged by Ward Morehouse, I wrote my first piece in 1978 for *Development Forum*, titled 'Development Against People'. Some years later, I wrote another essay for *Development Forum* but this time found I could reverse the earlier title to: 'People Against Development'. These two pieces define the two ends of my writings on development during the period.

Parts of this book borrow heavily from essays published in *The Illustrated Weekly of India*, easily the outstanding critical journal of its kind on the planet. I thank Pritish Nandy, its editor, for

support, comradeship and demonstrated trust. I did not know him when he took over the *Weekly* in 1983. I still do not know him well. But he thought I had something to say which the country should hear, and he gave me the opportunity ungrudgingly. Other editors I gratefully acknowledge are K. N. Hari Kumar of the *Deccan Herald*, Vepa Rao of *The Hindustan Times*, and people in the *Indian Express* and elsewhere, too numerous to mention. They gladly gave me the opportunity to write what I had to, even though they themselves might have disagreed strongly with my views.

This book was written as part of a project on science and violence carried out by Ashis Nandy on behalf of the Committee for Cultural Choices and Global Futures, Delhi, and the Peace and Global Transformation programme of the U N University, directed by Rajni Kothari and Giri Deshingkar. Ashis is a man of consummate mental agility, and, fortunately for me, inordinate patience. Without his encouragement, this book would have been published a decade later. Working with him on this project was one of the most stimulating periods in my life.

The late B. V. Krishnamurti's writings also provided me with important clues to this book. Uncle Idris, President of the Consumers' Association of Penang (C A P) was another welcome guide. He too had taken note of 'Development Against People' in 1978, and his anger against the continuing development deceit had led him to make 'disaffecting people' a central mission of his life. He shored up my faltering courage. Some of the sections of this book were first presented as papers at C A P seminars where I had the opportunity to address the leading intellectuals of the post-colonial world. The distinguished historian Dharampal, like Idris, also provided critical support, direction and guidance.

S. N. Nagarajan and Hugo de Souza commented on the first draft of the book. When they approved it, I was pleased: no criticism could conceivably be harsher than what these two gentleman are generally known to come up with. Also helpful were Iqbal Asaria of *Inquiry* and Ziauddin Sardar, and older colleagues like Ward Morehouse, who was often compelled to function as a source of materials I needed. Gauri Dange subbed the first draft of this book.

My gratitude to Norma, colleague, kindred spirit, wife and companion of many years' standing, remains generally impossible to describe. So it continues to be expressed through a more ap-

propriate form than words. Norma went through the manuscript thrice, helped clarify ideas, raised objections, and generally tidied up the presentation. Though she may reject the idea, this book in many ways is as much her work as mine. In marriages blessed by divine providence it is extremely difficult to state where the contributions of one partner end and those of another commence.

Others not mentioned because of my failing memory should rest happy that they are not overtly associated with a book like this.

C. A.

For Rahul, Sameer and Milind,
who will have to choose between being 'developed'
and being free

1
Development: Triage and Plunder

The idea of 'development', especially in the preceding four decades, has been closely identified with those of progress, modernity and emancipation. For that reason it has successfully maintained an aura of indisputable inexorability normally associated with the law of falling objects. But this view is misleading. I will argue that 'development' is a label for plunder and violence, a mechanism of triage. Gustavo Esteva recently concluded: 'development stinks'.[1]

Such images of development as plunder and triage sharply contradict the benign associations disseminated by development propaganda and related literature. Against that background, such images may appear incredible and even shocking.

The disillusionment with the development promise, however, has come sooner than expected, though from the victim's point of view it ought to have come much earlier. For many, the arrival of disenchantment and of divestiture has become an occasion for relief and release, for the end of 'development' signals the end of a tyranny.

Triagic Development

It is no longer possible to conceal the fact that development has often been nothing less than officially-sponsored triage. What do we mean by 'triage'? The term was brought into circulation during the debate on the global resource crisis forecast by the *Limits to Growth* report of the Club of Rome.[2] Western ecologists and doomsdayists argued that if indeed the resources of the world were limited, then those who had access to them and were already well off, should strengthen their privileged positions on spaceship earth, while societies already in ecologically impossible situations

should be left to fend for themselves. If in the process they perished, so be it.[3]

The Bhopal gas tragedy is an apt instance of development-as-triage.[4] In December 1984, a gas produced by modern technology escaped from the factory of a multinational corporation, invaded entire settlements, killed and ruined hundreds, effectively disrupted hundreds of thousands of families, and caused incalculable violence to the environment. The aftermath of that disaster has been more painful for the victims who survived than the disaster itself. They have become the living dead, with no known cure for their condition.[5] They have added to the numbers of *hibakusha* spawned by the modern age and its favourite child, development.[6]

The modern world has exorcised the ghost of the Bhopal gas disaster by reducing it to the status of a unique accident. But 'Bhopals' occur every day.

A survey of workers spraying pesticides and engaged in dusting operations in five Gujarat districts made by the Indian Institute of Management, Ahmedabad, revealed:

> None of the labourers was provided with masks to prevent the inhalation of toxic chemicals. Goggles to protect the eyes were also not available. Only 50% of the workers took the precaution of covering their nose and mouth with a cloth. Besides, 20 per cent did not wash their hands after completing the operations, and of those who did, the percentage of workers not using soap was 64 per cent, though washing with water alone is inadequate.[7]

The World Health Organization (WHO) estimates there are 500,000 cases of pesticide poisoning every year in the South. Of these cases, 5,000 are fatal, averaging thirteen deaths per day. In the USA alone, more than 45,000 cases of pesticide poisoning are registered every year, of which 200 end in death.[8] The WHO statistics are recorded from public sources such as hospital registrations, antidote prescriptions and so on. Since a large number of cases go unreported, the real number of pesticide poisonings is obviously much larger.

A study in Sri Lanka, based on an examination of government hospital records from 1975 to 1980, showed that annually over the period, 'an average of approximately 13,000 people were admitted for acute pesticide poisoning. Out of these about 1,000 died.'[9] These records once agan exclude cases treated by private practitioners, and those who died without seeing a doctor.

Such statistics on direct pesticide poisoning do not include still-births, cancers, miscarriages and congenital deformities. Calestous Juma of the Environment Liaison Centre in Nairobi has suggested that the actual figure of pesticide poisoning cases world-wide is in all probability two million, of which 40,000 end as fatalities. He also observed that 75 per cent of these, i.e. 30,000, die in the South. In other words, one person dies of pesticide poisoning every fifteen minutes.[10]

Sometimes, innumerable such days are compressed into a single event on a single day as when the faulty valve at the Hoffman–La Roche plant at Seveso, Italy, vented dioxin gas into the air, crippling the environs; or as when a fire at the Sandoz warehouse in Basle led to the poisoning of the river Rhine in November 1986. At other times, as at Bhopal, many years of such days are telescoped into a few hours, to produce a stunning impact on the living system.

A few localized deaths do not merit more than a small paragraph in our newspapers. It is the scale of the Minamatas, Sevesos, Hiroshimas, Chernobyls and Sandoz–Rhines that transforms these events into obscenities. 'Bhopals' take place every day because they are an inseparable part of the *development project*, sponsored by all regimes, whether of the Left or of the Right.

Union Carbide's Bhopal will recur because, legitimizing this hazardous system of production is a schema of costs and benefits that is incomparable in its primitiveness. The system is founded on a theory of man and nature that is an affront to history; and on an attitude to human beings, particularly workers, that would enable those who presently control and direct its operations to operate the gas chambers of Auschwitz without any compunction.

Of the 600,000 chemicals in production today, international standards regarding safe levels are only available for about 1,200. It would take at least another eighty years to check the approximately 48,000 chemicals in the U S market alone, by which time another 40,000 chemicals will have come into the market. An average of $ 500,000 spent over three years is required for each product-testing. Since (it can safely be assumed) this will never be done, human beings and natural systems will work out the tests on themselves over the years, free of charge.[11]

The same reasoning that demands the production of pesticides so as to wage unlimited war on other species, declared 'enemies' by

agricultural science, underlies the production of toxic chemicals without adequate safety precautions, among a population too defenceless to react except in pain.

What we are confronted with is not a chance occurrence but a perpetually *dynamic* and hazardous system, patronised on a number of assumptions that have never been scrutinised or subjected to democratic consensus. These assumptions tyrannize public policy: a natural enough state of affairs in a world where the ruling mobs can impose their point of view and further their own interests, even if this is destructive to others on a continuous basis. The commitment to 'economic growth' is awesome: in Bhopal, it was taken to absurd limits. The Union Carbide plant was 'not a stone that it could be just lifted and taken out', said a Minister in the State Assembly, when some members demanded its relocation from the crowded city site a few years before the disaster.[12] It was the city's population that shifted out during the days of 'Operation Faith'.[13]

Human beings today allegedly possess a Universal Declaration of Human Rights, but this charter is worthless compared with the more fundamental rights that have been unilaterally granted to modern technology. Even when it kills and maims, the megamachine, unlike human beings, is not culpable; culpability is reduced to inadequate morals or incompetent shop stewards.[14] No one suggests that the machine be shut down, let alone that the principles on which it is based be scrutinised or abandoned.

The megamachine has its own Declaration of Rights before which the rights of human beings and nature take second place. The development of computers and automation, for instance, is specifically set against the right of young people to work. Technology, and those who own it, have little or no respect for the rights of people. Even High Courts and Supreme Courts invariably defend the rights of technology. For instance, the Supreme Court of the U S refused in 1980 to defend the rights of benzene workers to be subjected to more rigorous standards of exposure, despite evidence being available that the prevalent standard resulted in workers' chromosomes being damaged. For all these institutions (and one should include here also the banks), in comparison with technology, a human being is second-class, expendable.

What we have noted is true not only of the South, but of the North as well. Wars against the production of hazardous goods

were first waged in the North and they still continue. When Adolf Jann, President of Hoffmann La Roche, was asked about the suffering his company had caused in Seveso in July 1976 after the dioxin accident there, he replied, 'Capitalism means progress, and progress can lead sometimes to some inconvenience.'[15]

The Bhopal gas disaster was the climax of a hazardous system sponsored by a development paradigm that has been, even in its origins, profoundly anti-people and anti-nature.[16] The association of development with suffering, with increased threats to survival, its use for *himsa*, is thus not a new or accidental occurrence.

Esteva confirms this: 'The damage to persons, the corruption of politics and the degradation of nature, which until recently were only implicit in development can now be seen, touched and smelled.'[17] The intensity of *himsa* has increased with the expansion in scale of the development thrust.

The exercise of industrial technology in the last two centuries has involved human and natural costs never before associated with the production process. Even while Blacks were sold in the Americas as slaves, two-thirds of the population of Europe were subjected to a life of penury and environmental degradation, in order that the new technology could be given a decided political advantage.[18]

With the expansion of population, as the system of enclosures was adopted in England, rural folk were perceived as obstacles to development. New theories of rights and privileges were enunciated to compel them to migrate to the cities, where they were coerced into taking up factory work.

In *Homo Faber*, I observed that industrialization based on fossil fuels demands an inevitable and corresponding de-industrialization elsewhere: mechanization first ruined and then eliminated craft.[19] Though this pattern originated first in England, it was adopted by other countries where industrialization programmes were attempted. Thus, Europe could maintain its pattern of industrialization because colonialism undermined the industries of the colonies, increasing suffering and threatening livelihoods there.[20] Europeans also found themselves fortunate in another important respect. Their societies were going through a phenomenal population explosion that induced migration and the settling (as against colonizing) of other lands.

Large areas of the non-European world became available to

Europeans at the expense of the local inhabitants. The invasion of America, Australia, and other land masses led to the extermination of indigenous cultures. A recent estimate of the number of original inhabitants of the Americas in 1500 puts the population at around 90 to 120 million, more than the estimated population of Europe at that time.[21] Thus, a new global niche was carved out which would be responsive to the demands of the European machine and not any longer to the needs of the non-European ones.

In other words, the industrialization process in Europe was based on mass pain, initially of its own people, later, of those of other societies. The situation in the West only improved, in fact, when poor Europeans were enabled to transfer their suffering to non-Europeans, through the instrument of first, colonialism, and next, development. The industrialization effort of the West in the eighteenth and nineteenth centuries is passed off as a major exercise of ingenuity. Ingenuity there was (as there is in any part of the world when new problems confront the human mind) but here it was also accompanied by graphic exhibition of the worst human qualities—'the black legends' that we normally associate with colonialism—and the equally black deeds associated with today's development.

Post independence, when the new nations of the South attempted to industrialize (under advice from the West), they faced two severe constraints. One, the industrialization of the North was still under way, and therefore the ecological niches established by it during the period of colonialism, which included large parts of the South, had to be still maintained and expanded, instead of being allowed to service the needs of the local population.

Second, the God-sent opportunity available to Europeans—additional lands to settle in overseas—was not available to the countries of the South, who had to do with the land they always had, and on which they had earlier nurtured civilizations of permanence.

The logic of industrialization demands ample space, geographical space, colonies. The industrialization effort of the South had to interiorize the concept of the colonies—colonizing its own hinterlands, mostly settled with subsistent and ecologically harmonious communities, and subordinating these to the requirements of the industrialization programme.

The effort to produce at best even a limited Western-style 'development' had to be executed against the survival capacities of millions who would insist on remaining outside the system; such development would be premised on undermining both their life styles and their rights to resources. Development inevitably became officially-sponsored triage. The evidence cannot be denied: in the past four decades, everywhere in the South, the condition of the vast majority, after development, has deteriorated rapidly, in numerous ways, measurable and immeasurable.

The earlier battles for and against triage between the powerful nations and the so-called poorer nations are now being replayed afresh between those behind industrialization projects in the South, and their victims. Those endorsing such development, including several political leaders of the South, have decided views that the active pauperization, displacement and even elimination of subsistence folk is not exceptional, need not be deplored, and is not only necessary but healthy.

Governments in the South legitimize the ideology of industrialization, underwrite its costs, give it priority. Industrialization requires not only that jobs be appropriated by the corporate or the modernized sector of the economy; it also demands that the resources traditionally used by the subsistence economy be reserved for the use of modern industry, since modern industry is allegedly based on modern science, and modern science, so the fable goes, comprises the most 'efficient' manner of processing resources in a world of scarcity.

The planner or government bureaucrat in the South insists that he has the sole right to decide how to process nature or human labour, since he alone has access to modern science. In addition, he claims to act in the national interest. Since science is efficient and resources scarce, only modern industry should be permitted to produce goods: both natural and older technological forms are inefficient, backward or slow.

The definition of efficiency is of course arbitrary. The legitimization of industry's rights over the rights of other processors has been adjudicated not by an impartial authority, but by powerful vested interests supported by an equally biased state power. Industrial processing, as we shall see later, has merely been assumed to be superior. Such unexamined assumptions can act as terrifying superstitions, generating in their wake an entire chain of painful consequences.

It may be politically difficult for our ruling mobs with their

twentieth century pretensions to civilization to practise open triage. The Europeans could eliminate the indigenous peoples of America or the Australian aborigines because they were simultaneously able to provide themselves with unchallenged divine theories of extermination based on notions that these groups of human beings were not part of the human species, but something lower in the scale of being.[22]

Development therefore comes hand-in-hand with displacement. For, while it is possible to maintain large masses of people on a relatively less intensively-exploited resource base, simpler technology and a wide array of occupations and trades, this is not possible at all with the industrialization project based on modern science. As we shall see later, modern science defines the use of resources in a highly aristocratic and wasteful way.

For this reason, the past three decades have seen development become war.[23] Governments from the South have teamed up with international financial institutions to slaughter their own folk: weapons purchased by governments supposedly to fight external enemies are used against their own people in development battles; and, via the development process, the richest and most productive of the country's resources are offered officially to those who can process them within the framework of modern technology.

These conflicts between industrialization and subsistence lifestyles have now reached a level of sharpness that makes it incumbent on us to call development itself into question.

Two different kinds of triage may be considered. One, *de facto* or passive triage, where triage follows as an inevitable consequence of development. The other, active triage—when clear, direct conflicts arise over resource use between powerful economic classes or élites and the rest of their societies. Development works actively to eliminate the latter's rights to ecosystems and the cultural lifestyles associated with them.

For purposes of general description, I have analyzed industrialization patterns in terms of two phases. In the first phase, following the example of the West, industrialization was closely linked with urbanization. In the second phase, industrialization was 'de-urbanized', so that greater attention could be given to the task of 'dynamizing' the so-called backward regions of the poor countries.

In discussing both phases, we shall draw out the covert and overt

connections between the industrialization project and both kinds of triage.

Passive Triage: Industrialization, First Phase

The twin compulsions of reconstructing the economy and achieving rapid economic development after Independence prompted India's rulers to adopt a model of development based on the experience of the West: its implicit emphasis on capital intensive industrialization and urbanization. Over a time a distinct bias became apparent towards urban settlements in general and big cities in particular.[24]

> The rural areas were encouraged to start such industries which provide urban populations with things like milk, vegetables, oilseeds, cotton and foodgrains and purchase from the urban areas items such as cloth, oil and other manufactures.[25]

The principal element in this strategy was the transfer of all but the most primitive jobs to the cities. In 1910, village industries involved 40 per cent of the labour force. By 1946, this had decreased to 10 per cent. Today, it is two per cent.

This first phase involved passive triage. Industrialization was restricted to the new metropolitan regions and was indiscriminate in the kind of products it manufactured. Planners were not unduly perturbed by the fact that a labour-surplus economy needed a different kind of production technology from the one made available under dependent industrialization; the latter, based on import substitution, generated in its wake a gargantuan appetite for foreign exchange.

The Indian textile industry offers one instance of how expansion of the modern technological system and poverty go hand in hand. Also, it demonstrates how the 'other' textile industry (the non-modernized one) has suffered in the post-independence period. In fact, the final onslaught on the traditional textile sector is taking place with the patronage of the modern Indian state even while this book is being written.

If Dadabhai Naoroji were to hear of some of the developments taking place in the country's textile industry today, he would turn in his grave. Those who were brought up on R. C. Dutt's *Economic History* remember Dadabhai berating the colonial government for its policy towards indigenous textile producers. Dadabhai pro-

tested loud and clear against Britain's attempts to destroy the indigenous textile industry by flooding the Indian market with cheap manufactured textiles.[26] No one then, least of all Dadabhai, would have thought that with the arrival of a popular Indian government in Delhi, the same discriminatory policies would not only be maintained but given greater backing.

In fact, if we evaluate the new trends set in motion today it is obvious that the government, despite its socialist rhetoric, has decided to eliminate three large groups of textile producers: those working in the cottage woollen sector, the handloom sector, and in the handblock-printing trade; and this, despite the evidence that on all grounds—technology, investment per workplace, employment, productivity, use of local resources, exports—the decentralized non-modernized sectors are clearly superior performers. This time, however, the powerful lobby behind the new developments is not a group of textile interests based in Lancashire or Manchester, but an organized Indian textile producers' lobby in New Delhi. Of course, the demolition of non-mechanized trade is being effected in the name of helping 'the weaker sections'.

The government's 'technology policy', announced with great fanfare at the Tirupati Science Congress in January 1983, contained a hotpotch of mutually contradictory criteria.

With regard to the traditional sector, the policy laid down that the government would provide the maximum gainful and satisfying employment to women and the weaker sections of society; that it would emphasize the use of traditional skills and capabilities, making them commercially competitive; and that the planners would ensure a correct mix of mass-production technologies and production by the masses.

The next three points of the technology policy, however, stated the exact opposite; planners would be instructed to identify obsolescent current technology and arrange for modernizing both equipment and technology; they would develop technologies which were internationally competitive, particularly those with export potential; and they would take steps to improve production speedily through greater efficiency and fuller utilization of existing capabilities, and enhance the quality and reliability of performance and output.[27]

If these different criteria were to be applied to technologies producing different products, then the new policy might have had

some rationale behind it. What is preposterous, however, is that they were supposed to be relevant to the production of the same goods. Therefore we have nothing short of a war situation between the two classes of producers using different technologies.

In the circumstances, as it was with colonial trade, those who contribute to party coffers, to the pockets of licensing bureaucrats, to exports, and to figures that indicate economic growth, are bound to win. This is exactly what has happened in the textile industry: in the name of increasing textile output ('for the weaker sections') India has begun to eliminate the jobs of the weaker sections.

There are two recent studies on this question. The first, issued by the Industrial Development Services (IDS), Delhi, is called *Contribution of Handicrafts and Handlooms to Indian Development*.[28] The second, by L. C. Jain, is bluntly titled, *Textile Policy Set to Annihilate Employment in the Woollen Cottage Industry*.[29] Both studies lucidly expose the dishonesty and ambivalence of the state in this development.

The cottage sector in the woollen industry is concentrated in three distinct climatic regions: hill areas, deserts and plains. Two of these areas, the hill and desert regions, are already discriminated against, having little employment opportunities other than the weaving of textiles, due to the lack of power, communications, productive assets and resources; even agricultural jobs are scarce.

Yet, as L. C. Jain demonstrates, employment in the traditional trade at an all-India level is an impressive 2,50,000. This involves households that are mainly self-employed and belong to poorer groups, mostly Scheduled Castes and Tribes; within families, it is mostly the women who spin and the men who weave.

The final products are essentially for self-consumption and local use. The cottage industry is a unique case where the poor have found an industry which meets their demand for essential products made from raw materials available locally, utilizing simple and inexpensive tools and techniques generated by the producer, operated without power, with the employment available in seasons when the producers need it most. Aware of this, Jain writes, the earlier policy makers had taken some measures to protect this cottage sector from large and mechanized woollen mills. 'On [a] similar consideration, the late Govind Ballabh Pant, in his capacity as Chief Minister of Uttar Pradesh, had thwarted attempts to set up woollen spinning and weaving mills in the UP hills.'

Yet, in March 1981, the protection afforded to this cottage industry from the mechanized units was suddenly withdrawn; for phony reasons. A new directive announced that the government was keen to promote the growth of the woollen sector, improve its productivity, its access to ready raw material, and to provide better working conditions to labour.

The new rules concerning raw material (wool and imported shoddy) are designed to expose the cottage sector to the sharks of the market place. Since a foolish policy in another department of the same government permits the export of sheep for meat, the production of wool has remained stagnant over many years. In such circumstances, the newly-empowered mechanized units will outbid the cottage units for raw material supplies.

Since the price of yarn is bound to rise, the cottage units must increase their prices for the end product, pricing themselves out of the market. In effect, decontrol of the mechanized sector means that we have eliminated one more avenue of production by the masses. Women, of course, are the worst hit. Unfortunately, the shepherd spinners and weavers from the hills and desert areas are too disorganized and underprivileged to form their own lobby.

Very similar points are made by the IDS report on the handblock-printing trade. On the grounds of employment, exports and equity, the handblock-printing industry easily outperforms mechanized units. The labour input is fifteen times that required in the mechanized sector. Investment in the latter is over twenty times what the informal units demand.

It is not that these points have not been recognized by the planners, but consider the farcical history of government 'protection' afforded the small units. In 1954 the government put a ceiling on the production of mill cloth, ostensibly in order to relieve the distress being caused to the handprinters, but the ceiling was 50 per cent higher than what the organized mills could actually produce. In 1962, the government raised the ceiling from the earlier 750 million yards to 900 million metres. This was an invitation for the mills to increase their output.

In 1966, the ceiling was removed altogether, on the recommendation of a study report which concluded that the ceiling was a farce. The same report, however, had also recommended a simultaneous reservation of select textile products exclusively for the handprinters. Subsequently the Textile Commissioner, presumably

with the concurrence of the government, permitted the mills to print sarees on superfine cloth, something that hit the handprinters the most.

It is instructive to note that mechanized printing of cloth is a post-Independence phenomenon: today the mill units produce a record 2,400 million metres. The result: since Independence, 2,50,000 jobs have been lost to the economy. The IDS survey emphasizes that it is the handprinters who have been the actual mainstay of our textile exports: the value of their output rose from Rs 93 million in 1975–76 to Rs 302 million in 1979–80.

The mills, on the other hand, have used the plea of stimulating exports to demand decontrol and elimination of ceilings, *yet 93 per cent of all mill production is for the domestic market*. When exports fluctuate, the handprinters suffer, since they cannot fall back on the domestic market which they no longer control.

No promotional aid has ever been afforded to the handprinters, while we do know how solicitous government agencies have been about organized mills' requirements. The failure of protective measures, matched by the absence of promotional schemes, have reduced the handprinters to beggary, in a manner that makes a mockery of all the directive principles of state policy.

The Sixth Plan requirements are supposed to add up to an additional 1,600 million metres. The organized sector can produce this with 27,000 hands, while the handprinters would require 4,00,000 of their people for the same job. In a labour-surplus economy it is a crime to ignore our most precious resource, labour, especially when we keep on talking of the 'optimum use of resources'.

But decisions have evidently been taken. As L. C. Jain concludes in dismay: 'It is tragic that an industry which originated in the civilization of Mohenjo-Daro, flourished during the Mughal period, survived the many-pronged attacks during British rule, should have been so badly mauled during the period of planned development.'

The textile industry is thus a clear instance of the manner in which de-industrialization has peaked after Independence as a result of development. In 1985 the government brought this 'triagic' development to a fitting climax with a new textile policy that aimed to further capitalize the sector, throwing even more millions out of work.[30]

Predictably, the new Textile Policy Statement announced that year paid rhetorical tributes to employment. It observed: 'The textile industry has a unique place in the economy of our country. Employment and export earnings are very significant. This industry provides one of the basic necessities of life. The employment provided by it is a source of livelihood for millions of people, most of whom live in rural and remote areas. Its exports contribute a substantial part of our total foreign exchange earnings. The healthy development and rapid growth of this industry is therefore of vital importance.'

Thereafter, the statement is routine. Complaining of 'structural weaknesses', it throws open the textile sector to the 'healthy competition of the market place'. The new licensing policy for units will now be 'pragmatic'. There is more talk of retrenchment than employment in the document. All this is sought to be achieved because 'the per capita consumption of cloth of our growing population still remains at a very low level,' and because there 'is a large unsatisfied demand for durable synthetic and blended fabrics at cheaper prices which is not being met by indigenous production.'

In a statement issued against the 1985 Textile Policy, Dastkar, a society for craft and craftsmen, noted with anger that 'the key protection given to handlooms against the mills has been abolished.'[31] The government sought to console the weavers by restricting to them 'the entire production of controlled cloth in future'. Earlier the mills were compelled to produce such cloth as a social obligation: being the cheapest variety of cloth, its production invariably resulted in losses. Now, it would be 'the privilege' of the weavers to produce it! Thus, concluded Dastkar, the skill of the weavers would be downgraded irreversibly, even while the mills would equip themselves with the latest imported machinery. All in the name of development and progress.

What has occurred in the area of textiles has been repeated by 'development' in the other labour-intensive, subsistence industries. These include the manufacture of shoes, matches, soaps and oils, tools, etc. In each case, the large-scale units have destroyed village-, cottage- or small-scale industries, and ruined subsistence, increasing the migration of the dispossessed to the cities, adding to the numbers of unemployed.

Self-sufficient individuals and communities have been broken

up, left to fend for themselves, eventually to become the target for development groups peddling 'new' concepts of basic needs. Their rights to subsistence, to local resources, have been compromised, and substituted by needs to be defined and satisfied by criteria laid out by the bureaucracies of the South, often with a little bit of help from international financial capital.

Writes Darryl D'Monte:

> The figures clearly show the futility of expecting industrial growth to take care of employment in Third World countries like India or China. Developing countries as a whole have been growing faster—5 per cent per year through the late fifties and sixties—than their Atlantic counterparts at a roughly comparable period in the early nineteenth century (3 per cent).
>
> And yet in India in 1978, nearly 21 million people were unemployed—over 16 million in the countryside and a quarter as many in the cities. At that stage, six million more workers were entering the labour force yearly but both the public and private sector could only absorb half a million a year. The country's total labour force is likely to grow from 225 million in 1975 to 400 million by the turn of the century, but industrial employment, growing at roughly 5 per cent per year, could at most give between 25 and 30 million people jobs by 2000, leaving the vast majority idle. There is just no way that big industry can provide people in poor countries with the means to live a better life. The total labour force in the organized sector is only 23 million today.[32]

Those outside the industrial system now include more than half the country's citizens. The economy, rooted in market principles for the distribution of goods, routinely defines them out of existence. The economy operates as though they are of no consequence to it whatsoever. This may be considered *de facto* triage.

In the case of Wardha district (in which Mahatma Gandhi himself settled for some years) the 'de-industrialization' momentum is shocking. During the past thirty years, only two oil *ghanis* remain in operation; all the others have shut down. Not even the improved Khadi and Village Industries Commission (KVIC) models have been able to compete with the urban organized sector. The two *ghanis* that remain must get their oil seeds from distant regulated markets to which even the farmers in Wardha sell their produce. The same fate has been reserved for carpenters, potters and cobblers.[33] 'Villagers', said Annasaheb Sahasrabudhe, 'have been turned into second class citizens, as if serfs for the supply of cheap raw materials. To be maintained by subsidies and grants.'[34]

Passive Triage: Industrialization—Second Phase

The phenomenon of the indiscriminate drafting of rural resources for the service of urban-biased industry has been with us for some time. Once it may have seemed 'natural' that rural areas transferred their 'savings' to the industrialization projects in the metropolises, so that the latter could then provide the countryside with new knowledge and new tools. This in itself was not an unusual idea. The Japanese implemented this policy almost tyranically during their industrialization effort in the Meiji era.

But we went further and pledged, besides the rural surplus, other crucial resources of land and forest (what B. V. Krishnamurti called the ecological endowment of the rural areas) to the demands of the industrial machine. The first phase of industrialization has therefore been followed by a second: the so-called industrialization of 'backward areas' (as most of the industries set up in the first phase were located in metropolitan regions). The rural environment is now being actively requisitioned in the service of dependent industrialization. It is important to analyse what this trend involves.

In brief, the second phase of industrialization has set out to establish primacy over the resources of the *kampungs* or villages, by transferring its technologies there, and staking claim, with the support of the state, to resources previously enjoyed or processed by rural communities.

Under the new slogan of 'developing backward areas', planners have located large-scale factories closer to the resources they wish to exploit, ignoring the fact that these resources served the needs of rural populations. Whenever a giant industry has entered a rural area the result has been predictable: the industry has run roughshod over the rights of the local folk.

This is the blunt reality behind the new slogans of 'industrializing the rural areas': opening them to the cutting edge of imperialism through socially-engineered projects such as the green revolution, white revolution, cash-crop farming, hydel projects, mines, large-scale industrial plants, even luxury tourism.

Not unnaturally, in the new scheme of things, the rural areas have become politically the weaker partners. Militant farmers' movements demanding better prices for agricultural products might return some of the urban-misappropriated surplus to the

countryside, but they do not show any signs of tackling the real problem: what do you do if the very basis of your survival in the fields and forests is undermined? If your life-support systems, or (in B. V. Krishnamurti's phrase) the ecological endowment of the region is irreversibly devastated?

Some of these issues can be illustrated with an account of the Seshashayee Paper Mill (SPM) in Erode (in the state of Tamilnadu) and what its presence came to imply for the bamboo resources and craftsmen of that state. The connection forms the basis of S. Ramesh Bhatt's *Problems of the Management of Bamboo Resources in Tamilnadu*, a study sponsored by the Bombay Natural History Society.[35]

Bhatt begins by describing the indiscriminate utilization of bamboo resources for the paper mill as a 'major aberration'. His study reveals that bamboo stocks have declined in forest divisions such as Salem, Vellore and Tirupattur and its regeneration in the flowering areas of Satyamangalam, Erode, Hosur, etc., has not been inspiring either. This had led to severe imbalances in the forest vegetation with their attendant ecological problems.

Most significant, traditional workers in bamboo, such as the basket weavers, find it difficult to carry on their trade because of the scarcity of bamboo in some areas, and interrupted supplies combined with prohibitive costs in others.

The rural user of bamboo, hit hardest by the high prices, is compelled to look for substitutes. The SPM itself is finding it difficult to get enough bamboo for its needs, although permission to start the mill was predicated on large supplies of bamboo. Bhatt ends his study by observing that if some drastic steps are not taken by the Tamilnadu government, bamboo stocks in the region may be totally exhausted.

The SPM began operation in 1962, and the chain of events following from this has a familiar if not sinister ring. While basket weavers are forced to pay the equivalent of Rs 1,500 per tonne of bamboo, the mill's supplies of bamboo are heavily subsidized: it pays a mere Rs 22 per tonne of the raw material to produce eventually a luxury product, paper, which in addition is often profusely wasted by those who buy and use it.

The Forest Department has proved to be an incompetent guardian of bamboo wealth. For example, the bamboo plant flowers gregariously after considerable periods of time, but the

culling of bamboo in flowering areas has been thoughtlessly permitted and seeds have not been collected. Even today, bamboo extraction follows no silvicultural rules, and if there are any, the contractors have not heard of them. The working plan for Tirupattur Division (1964–74) itself admits: 'The so-called extraction is nothing but regular hacking of bamboo clumps. This damage has become serious since the beginning of the supply of bamboo to the paper mill at Erode.'[36]

The rural citizen is not only not benefited in these circumstances, he is actively discriminated against. The industrial use of bamboo is encouraged to the detriment of its traditional uses for construction, agriculture, and handicrafts. The latter provide employment for thousands of people who have no alternative skills.

Bhatt provides telling accounts of the lives of basket weavers and their increasing miseries. 'As with most developmental decisions,' he writes, 'which are taken after considering the costs and benefits affecting only a certain sector of society', while setting up the S P M the long term impact of this decision on the common man does not seem to have been examined thoroughly.

> It is in such situations that the question of priorities arises—whether to meet the requirements of the common man or that of the paper mill. Unfortunately in Tamil Nadu today, the decision seems to have been made favouring the paper mill. For instance, in the Satyamangalam areas division, for the past three years, all the coupes have been allotted to the mill.[37]

While Bhatt also mentions other causes of bamboo destruction including fires and cattle grazing these seem to be insignificant compared to the mill's sustained demand for 50,000 tonnes of bamboo per year. The nature of the deal involves other losses as well. For example, elephants for whom bamboo is special turkey, have begun to run amuck in adjoining crop lands causing extensive damage. Bhatt also warns that soil erosion accompanies bamboo destruction, since the species is an excellent soil binder.

For the bamboo workers, the right of access to common resources has now been converted against their interests into a right of exclusive access for the paper mill. There is no rationale for discriminating against thousands of bamboo workers in favour of a few hundred mill workers, except the unthinking din of 'progress' reflected in the urban demand for paper. We have no way of indicating as yet the economic implications of all those jobs lost in relation to the few created.

Active Triage: Industrialization—Second Phase

The calculated direct abuse of local communities by large and small-scale industries set up in rural areas is considered here a form of active triage. This will be illustrated with the aid of four examples, all from India, which are representative of a world-wide phenomenon manifest in countries as diverse as Japan, the United States or Malaysia. In fact, after the planet's experience of Minamata Disease in Japan, we could as well refer to active triage as just another label for what has come to be known as the 'Minamata Syndrome'.

The Kabini Paper Mill in Karnataka

The Kabini Paper Mill (KPM) in Nanjangud *taluka* of Karnataka is, to all appearances, an innocuous, small-size factory producing about seven tonnes of paper a day from a variety of raw materials including waste cartons.

When a group of us visited it on a Sunday afternoon, there was no factory official on the premises, but on seeing the invasion (there were about twenty of us, including a few ecologists), a staff member came out to ask us what we wanted. We explained to him that we were studying the environmental effects of industries located in rural areas.

We were in for a pleasant surprise, for as he described it to us outside the gates, the KPM was a model paper-making unit, and there was 'no pollution' associated with the factory at all. In fact, he said, no effluent was released outside the factory premises. Whatever little effluent was produced (and it was hardly anything as the factory used waste paper as feedstock) was treated and digested in tanks.

That introduction was his undoing; it indicated to us that he was either lying or that the factory was not functioning, which it clearly was that particular afternoon: the purr of the small monster could be heard outside the gates. Now, more than ever, we were keen to examine the inside of a paper mill that did not produce foul, polluting effluents, a miracle of sorts, which we had to confirm before we announced it to the world. At this stage, the man said we could not go in, since we must first get permission from the secretary, who was unfortunately absent. But he would try to locate him on the telephone.

That was when the villagers saw us and asked us the purpose of our visit. On being told, they were visibly upset and insisted we go down to the village and see the ruin that the paper mill was visiting on their lives. Surprised again, we walked down to the village and to the fields. What we saw there infuriated some of our team members so greatly that they refused to go back to the mill to meet the officials who, informed that a team of environmentalists had arrived, had hurriedly appeared, sacrificing an afternoon nap at home.

To meet regulations, the factory authorities had constructed three lagoons connected by meandering canals where the effluent was ostensibly being treated. Often, however, the untreated effluents were discharged directly into the village drinking-water supply. The villagers informed us that the discharge occurred between twelve at night and four in the morning. Catch any government authority visiting the factory at that hour. The chairman of the village *panchayat* was being paid Rs 800 a month to keep quiet, and to accept the ruin of everyone's health, including his own. He was, they said, recovering the money he lost in the last elections.

Between the factory boundaries and the water canal of the village, the effluent usually overflowed the channel, scorching large tracts of land. During the day, the water level in the canal receded, since there was no discharge, but the dried effluent on the grass along the canal indicated the level actually reached at night when the chemical brew entered the area.

The three villages of Kallehalli, Kathadipura and Chamalapura had no alternative source of drinking water. They continued to drink the contaminated liquid. Children and women had red eyes and swollen bellies, and almost everyone complained of stomach pains and skin rashes. Large numbers of livestock had perished since the factory had begun operations two years earlier. In Kallahalli alone, 150 sheep had died, and in Chamalapura, between 150 and 200.

Across the canal, the fields were gradually withering. In one field, the poisonous slurry had formed a large spongy mass, like a mound, and the soil around it had a bouncy quality to it. Paddy yields per acre had dropped from 20 to 15 quintals. The K P M had furnished a solitary tap in the Scheduled Caste area of the village which carried water from the factory, as if this were sufficient for

the population of three villages, for cattle and sheep and for irrigating fields. This however was the KPM's idea of what constituted compensatory justice.

The KPM, we found, was not alone in its criminal negligence towards public health. The Rasoli Paper Mills dumped its effluents into the Kabini river as did the Kareem Waste Silk Factory. The Sujata Textile Works let its effluents into the river upstream, about 300 yards from where Nanjangud town took in its water for drinking.

The Industrial Estates at Patancheru and Bollaram in Andhra Pradesh

The road from Hyderabad to Patancheru is paved. With good intentions. Like the road to hell. The progress of people, according to *sarkari* wisdom, is connected in some profound way with highways and industrial estates. Patancheru actually lies 30 kilometres on the Hyderabad–Bombay highway. You don't need to be told that you have arrived, for the odour that greets you (later you discover it's from the Voltas factory) as you enter the settlement is like the stench emanating from a dozen dead rotting cows.

Bollaram, the other industrial estate, is more truly frontier country. It is at a distance of five or six kilometres off the highway, not very far from Patancheru. The road leading to it branches off initially with some confidence from the highway, but soon surrenders to potholes and eventually disappears. Within the Bollaram industrial estate itself, there are no roads or drains, only open gutters. We are in the country of gutter capitalism.

Every morning, a motley crowd of capitalists, NRI managers, men and women workers travel to the two areas from the twin cities of Hyderabad–Secunderabad, much like an army moving out to occupied territory. Flashing Maruti cars driven by well-manicured managers expertly dodge the ubiquitous potholes as smartly as they keep environmental laws, district magistrates and High Court judges at bay.

Once safely ensconced within their individual factory walls, managers and workers commence their primitive operations in over a hundred units, producing a bewildering variety of modern commodities from alcohol to pesticides and pharmaceuticals. Some of the units are sick. In the successful ones, the profits are grand.

The total output of both estates, according to one source, is close to Rs 4,500 crores per annum.

There is only one problem.

The industrial success has become entrenched in an ecological disaster of horrendous proportions.

My starting point at Patancheru is a doctor. Kishan Rao and his wife together run a clinic called the Usha Nursing Home. Dr Rao also heads the Citizens' Anti-Pollution Committee of Patancheru. And now, even as he talks, patiently explaining details of pictures taken of the pollution, the stench of Voltas comes in uninvited and occupies the vacant seats and room, Big Brother, like God, everywhere, in every nook and corner. It mixes with the rice in the plate, in the tea and biscuits, and all I can think of selfishly is when I can leave the place.

Hell is a place you cannot leave.

A kilometre away, Mr Aggarwal, proud farmer of a sixty-acre plot, has his own story to tell. In 1970, his farm produced 700 bags of seed for the Andhra Government. His dairy produced 400 litres. He employed 150 people. By 1982, the irrigation wells he had constructed at great expense were polluted beyond use. By 1985, all his animals were dead. Now he wanders aimlessly about the worthless piece of property. The polluters: Standard Organics, Dexo Laboratories, M. C. A. Chemicals, Saibaba Cellulose.

In Ganapatigudam, another village, I am shown what must have once been a lovely underground cistern, with neatly carved steps, the traditional source of water for the village. The water is smothered with a film of green. No pot has disturbed it for nearly five years. Near it, the Government has installed a borewell and pump going down 140 feet. The village boys crank the pump up and down for a while. To my utter amazement out gushes a torrent of blackened water.

Lachamma, an old woman, stops us and begins to cry. First she suffered from watery eyes; then she grew progressively blind. She owns three acres of paddy, which she has stopped cultivating completely. Her sons and daughters are now wage labourers. Villagers bring out cooking vessels: these show obvious signs of corrosion. I am reminded of Goa 's chlorine gas disaster: a chlorine tanker from Ballarpur Industries to Hindustan Ciba Geigy goes off the roads: the deadly chlorine enters people's houses and in the space of a few hours discolours and ruins all available copper vessels.

'The rice that we manage to grow with the polluted water', explains Ram Hanuman, an activist from the Anti-Pollution Committee, 'has undergone chemical transformation. Normally our people prepare rice in the evening, some of which is kept aside for the next morning's breakfast. We can't do that any more, simply because this rice will not stay for more than three hours.'

As we walk down to the Nakka Vagu river, we see numerous lorries ferrying off loads of topsoil from the rice fields. Those farmers who have stopped their paddy cultivation are now selling the top soil to brick-makers, so they can continue to survive.

The Bhopal gas disaster shook the city of Bhopal six years ago. The intensity of its havoc stunned the globe. The environmental nightmare I am encountering here at Patancheru is as appalling as what happened at Bhopal. Only it is not restricted to a few hours but spread copiously and unendingly over 365 days of the year. Across a bend, we come face to face with the Nakka Vagu: its waters are crimson, almost purple. The waters of this river once fed the prosperous population of fourteen villages. Now they could as well be used to tan leather. A sister river, the Chinna Vagu, is red.

The Chinna Vagu soon joins the Nakka Vagu, red mixes with crimson, and the toxic stream eventually ends up in the Manjira reservoir, which supplies water to the twin cities. Poetic justice: the circle of poison is complete.

With the devastation of nature, public health has collapsed. The pollution has struck like a medieval plague, causing large-scale destruction of health, wealth and life. Fresh air has fled to other environments and is as rare as ambrosia. There are of course no water sources that have not succumbed.

Polluted water is to be found at a depth of 1500 metres on both sides of the Nakka Vagu and nearly two kilometres away from the river bed. 'No animal grazes, no bird flies.' Even if the pollution is completely stopped, says one of the people from the Anti-Pollution Committee, it would take more than a decade for the water quality to be restored.

Officially the Nakka Vagu died on 4 September 1986, when the Revenue Divisional Officer at Sangareddy issued a notification that no person should utilize the water of the river any longer either for drinking or other purposes. There are still a few labourers working at the estate who do not read notifications: they end up with scarred feet and skin injuries.

A family health survey and medical check-up carried out by a team of medical professionals led by Professor Anjaneyulu, Dr Bhasker Reddy, Dr Nagaiah and other medical officers of the Rural Health Centre, Patancheru, produced the following incredible results:

No. of villages surveyed	4
Total population	2082
Registered	1682
Examined	942
Average morbidity	88 per cent

This was reflected highest in:

Respiratory diseases	196
Digestive disorders	115
Skin diseases	111

The villages surrounding the two industrial estates display a bewildering variety of industrially-induced illnesses: asbestosis, siderosis, pneumonitis, cancers. This is in addition to the high incidence of bronchitis, eye-burning, gastro-intestinal disorders, bagasse disease, skin lacerations and eruptions.

'I generally advise my patients suffering from industrial sicknesses to leave Patancheru for a while if they want remission from continuing illness,' Dr Rao informs me without asking.

More than a thousand acres of land have been taken out of cultivation: the soil's fertility has been destroyed. Crops wither for no special reason. Farmers who procured loans from banks for wells are unable to pay back anything as the wells have had to be abandoned.

More than 150 pumpsets have become corroded beyond use due to reactive water. Pipes transporting irrigation water have been ruined. PVC pipes submerged in the Nakka Vagu have melted. The effervescence in the Nakka Vagu, due to high reactivity, can be seen at several times during the day.

There are no fish of course any longer in the river. But the pollutants have also seeped into fresh water tanks and destroyed them. The Fishermen Cooperative Society of Patancheru which has 59 families and used to harvest the Kistareddypet tank, has been rendered totally bankrupt.

In addition to the daily dose of uncontrolled water and air pollution, villagers have to face the prospect of constant leaks of

poisonous gases. In 1986, there was a chlorine gas leak at Voltas. The Chief Minister, N. T. Rama Rao, announced that an inquiry would be carried out by experts. Nothing came of that. In February 1989 gases again leaked from the Voltas unit. Several people were affected and hospitalized. These leaks are in addition to routine emissions which are much beyond the standards set.

The pollution havoc of the Bollaram industrial estate must be seen and smelt to be believed. Everywhere open storm drains carry untreated effluents and wastes to the lowest point of the area, which unfortunately are the village grounds of Sultanpur. The largest and most arrogant polluter is A. P. Met. Engineering, in which the Government of Andhra Pradesh itself holds shares. A vast sea of ponds filled with a deadly, steaming brew together raise a stench of wickedness that leaves any passer-by gasping.

To one side of the lagoons is the Asani Kunta irrigation tank, also filled with effluents. As the effluents keep arriving, A. P. Met. employees breach the mud walls of the retaining lagoons, allowing the noxious brew to further poison the irrigation tank. Often more walls are breached to allow the effluents to crash into the neighbouring agricultural fields. Nowhere in the world has industry so viciously attacked agriculture as in Sultanpur.

'Children are no longer being born in that unfortunate village,' says Kishan Rao, with some anger and concern. Jeetaiah of Sultanpur died of lung cancer in June 1989; Mrs Narsing Rao also of Sultanpur died of lung cancer in February 1990. Gandaiah of Sultanpur died of stomach cancer in July 1989.

'If we go to visit the industrial units just to ask them what is being produced or what exactly is being dumped into the rivers or the air, we are thrown out at the gates itself.'

A complete survey of economic losses is yet to be done; preliminary surveys carried out by the Anti-Pollution Committee place the loss at Rs 15 crores. So far the industrialists have shelled out Rs 3.90 lakhs in Patancheru and Rs 98,000 in Bollaram as compensation.

Not surprisingly, the pollution is affecting the industrial units themselves. G. P. Ices, run by Jyothindra Gandhi in Bollaram, used to rely on ground water. Later, the neighbouring unit of Vanillin and Fine Chemicals commenced dumping untreated effluents in its backyard. Soon the ice made by G. P. Ices began to take on a red and brown colour. When Mr Gandhi asked for an analysis of the

water from his bore well, the laboratory informed him that it contained pollutants above standards, and he might have to get it treated before it could be discharged! The ice business failed and the factory closed for two years. Now the factory is run on a combination of ground water and water from the Manjira water scheme. The ice is still coloured.

The destruction of nature has been carried out to such a barbarous degree that all the state's horses and all the state's men, the environment departments and the pollution control boards, may never be able to put it together again.

Not that they didn't try.

Every relevant section of the country's laws available to protect the environment has been seemingly tried in Patancheru and Bollaram by the authorities or by the courts. Nothing has worked. A. P. Met. Engineering, for instance, continues its open and flagrant devastation of the environment day after day, year after year, despite the Water Pollution Control Act, the Air Pollution Control Act and the Environment Protection Act.

Such is our blind allegiance to the spirit of the age. Depravities such as these are shrugged off as the inevitable price of progress, as entrepreneurship, as rational economic activity. The economics is based on a technology whose impact can only immiserize the already deteriorating environment of defenceless villagers, and of the poor generally, who have been at the receiving end of the garbage of modern civilization for a couple of centuries. Should I drop a bottle of poison into a public water source, I can be arrested as a criminal. But if I do it through a factory via development, I may even end up being praised and rich.

The Tanneries of North Arcot District

The third case of pollution concerns the tanneries of North Arcot district in Tamilnadu. The tanneries discharge untreated wastes which contain inordinate amounts of chrome. These have contaminated and ruined ground water supplies, crops and public health. As in the case of the K P M, the Patancheru and Bollaram industrial estates and the Amlai plant (see below), the pollution has continued for years, despite protests and petitions from local communities.

Chrome is now secreted in the breastmilk of mothers in the area,

and large numbers of people in the district have accepted the fact that they must live with skin eruptions and boils.

The Indian tannery industry discharges on an average 500–600 million litres of untreated waste into the environment. Besides undermining water sources, this effluent has rendered lands unfit for agriculture, and in other places, led to a drastic decline in yields of crops.

It is easier for the tannery owners to debit the devastating environmental costs of their operations to the health of the local population than to set up effluent treatment plants.

The Orient Paper Mills (OPM), Amlai

This is an even older instance of rampant abuse of a local community's environment. The OPM is located at Amlai in Madhya Pradesh, on the banks of the river Sone. Its untreated wastes have turned the Sone coffee-coloured, eliminated its fish, killed numerous grazing cattle, and seriously undermined human health. But the pollution is brazenly continued, and the people seem to have lost all hope of ever containing the menace.

The OPM discharges some sixteen million gallons of waste water into the Sone daily, which pollutes the river downstream to a distance of forty kilometres. The water is unfit even for bathing and washing.

The pollution has been studied and reported, but nothing changes. In 1973, a team from the IIT, Kanpur, surveyed the area and concluded that the milk yield of cattle had declined, death rates had increased, calving periods reduced, and animals suffered chronic foot infections.[38] One particular report described the effects of the pollution thus:

> In human beings, the skin and foot diseases are a result of direct contact with the river water. People are found with dermatitis type of rashes, scabs and cracked and brittle upturned nails. Upturned nails offer ready scope for the growth of fungi which cause the nails to become discoloured and mottled.
>
> The effect on the cattle after consumption of the water is loss of appetite, loose motions (strong smell, yellower than ordinary dung). Death comes slowly. The animals feel dizzy, show toxic effects, and sometimes pass blood in the stools, showing internal haemorrhaging.
>
> The effect on agriculture is also considerable. *Kalingar* and *tarbuj* (water melon), which used to grow in abundance on the banks of the river, have

been eliminated, causing financial losses to the farmers. The impact is more striking on areas close to the mill. Cultivation of pulses has been affected by the smoke from the factory. According to an employee, the electrostatic precipitator of the thermal unit is often kept shut to cut expenditure.

In a memorandum to the district collector of Shahdol, the Sarpanch of village Bakaho has complained that hundreds of acres of farm land are being damaged by the pulp-mixed water of the research plant set up by the O P M.

The effluent also caused serious air pollution. The effluent containing hypo and hydrochloric acid at times releases tremendous amounts of chlorine gas in the air forcing workers in the nearby colonies to leave their quarters. Trees start shedding their leaves within 48 hours. The management has built a lagoon where the most toxic effluent is being collected. This effluent is later discharged into the river.

Flying flakes of foam from the effluent is a serious source of health hazard for the people of the surrounding colonies. Cooked food and other eatables lying uncovered get contaminated when these flakes fill the air of these colonies.

While the mill discharges the waste water into the Sone river, it blocks its natural flow during the summer months. The river water is diverted to the mill by setting up of a temporary (earth-filled) dam on the river during mid-December which is washed away by the monsoon torrents in July.

As a result of the impounding of the entire flow of water by the mill, 126 villages downstream are deprived of the basic necessity of water. The water supply scheme of Shahdol was originally based on the Sone 22 kms downstream of Amlai. This has been shifted to another stream at higher cost.[39]

Active Triage: Tribal Populations

Development has hit the tribals, about fifty-two million in number, the hardest. It was recently stated that the average life span of the tribals of Karjat *taluka* in Maharashtra had come down from fifty-five in the 1950s to thirty-five today. If this is true, millions of tribal life-years have been simply extinguished.

The immigrant Europeans exterminated the native Indian populations of the Americas directly; similar fates awaited the aboriginal population of Australia and the Indians of the Amazon in Brazil. But such direct elimination of unwanted or unprivileged populations is no longer necessary. One can simply use development instead![40]

The most effective agent of tribal conquest has been the numerous development programmes of the Tribal Welfare departments of the Central and State Governments. But the tribals have also been subjected to enormous survival pressure when planners

have imposed development projects designed to benefit non-tribals in tribal habitats. Tribals have been removed from their forest environments through (1) scientific forestry; (2) irrigation projects; and (3) large-scale industrial enterprises.

Transforming Tribal Environments Through Plantations

Colonialism inaugurated the first phase of declaring the forest dweller on the Indian subcontinent *persona non grata* within his own forest environment. This was done in the interests of 'conservation of forest wealth and ecological balance'.[41] Up to 1850, the tribals had done an excellent job conserving the natural wealth and maintaining ecological stability. Development, however, as we shall shortly see, is totalitarian.

The colonial administration desired to reserve the forests for itself to conserve revenue. As commercial felling devastated forests, greater restrictions were placed on the tribals in subsequent legislation.

Thus, paradoxically, the rights of the tribals to their pristine forest environment became the greatest obstacle to the replacement of such forests with plantations, euphemistically termed 'scientific forestry', since tribals cannot live in such degraded habitats. The plantations had been raised following the guidelines set by the National Commission on Agriculture (NCA): natural forests grow too slowly and have too many commercially useless species. Development means raising single stands of commercially useful quick 'forests' in the national interest. If in the process the Adivasi has to quit his garden of Eden, so be it.

Damming Forest Environments

The damming of river courses with big projects to supply irrigation and power, either for rich peasants or big industry, has led to the de-stabilization of millions of forest dwellers. This development has proved to be a major curse for the South.[42]

In each case, the tribals' rights to continue in their environment have been denied in the interest of development. No thought is given to these rights, much less to the rehabilitation of the dispossessed, who later flood the cities in search of jobs. The same ideology that sought to restrict forest-dwellers' rights to the forests is now used to displace them from their habitats.

The Narmada Valley project, for instance, is calculated to displace over a million people, half of them tribals. Achyut Yagnik has shown that the benefits of this dam will accrue to a particular class of farmers and to industry.[43] The vast tribal population is thus being sacrificed to enhance the material interests of those already better off.[44]

Displacement of Tribals Through Industrial Projects

The displacement of tribals by industrial projects too is a worldwide trend. The dispersal of heavy industry to the rural hinterlands is based on the assumption that the industrialist can ignore tribal rights. Decisions to site projects are made on the basis of narrow economic issues and the availability of transport and other infrastructure. In such a context, tribals are seen as an impediment.[45]

In all cases, tribal populations lying in the path of these projects have been uprooted and displaced without constitutional propriety. Development is here a synonym for displacement, and officially-sponsored triage. We know now how spurious are the claims of governments or institutions acting in the 'national interest': often 'national interest' turns against the people's interest, or the interests of the nation's peoples.

Development as Plunder

Development is plunder.

Plunder has been seen by some economic historians as a 'legitimate' form of capital accumulation resorted to in pre-colonial periods. Today, capital accumulation continues through identical means but is called development instead.

It is therefore not surprising that economic planners have come to see the rural areas as the last frontier for plunder, and people inhabiting such environments as impediments. Economics is nothing but the exercise of a 'frontier mentality', in which investors are invited or welcomed by development boards, or governments, to 'develop' virgin areas rich in natural resources, and environments that have not yet been contaminated by pollution, and to convert these into profits. The right of rural folk to their resources, of forests to their niche in the global ecosystem, are denied on the pretext that 'underdevelopment' is intolerable.

The industrialization project requires ever fresh resources to market for a price: resources like forests, that were either no man's property before or were of use value to millions. The value of the primary material is not created by the entrepreneur: he merely attaches it. Even the evolutionary capacities of plants crystallized over the centuries in their germplasm is sought to be appropriated by modern capital though the patenting of new varieties, based on their seeds.[46]

The development of tourism in the South is plunder: large reaches of inhabited, cultivated, domesticated living space, land, and water, are appropriated from local inhabitants and reserved for the satisfaction of those affected, or bored, by industrial routines and seeking to recover their energies at subsidised rates. This is nothing but plunder.[47]

The export of frogs' legs from the South to feed the over-nourished in the North is another area where a major element of the ecosystem is dismantled or literally crippled.[48] In like manner, India's cattle wealth feeds the beef markets in the Gulf countries. Chemical-based farming is also a form of plunder. Fertilizer production takes away non-renewable resources from future generations, as distinct from traditional farming methods which maintain fertility over centuries.[49] The kind of farming that such modern technology advocates resembles a form of mining: the soil is mined for its resources, till it is depleted and becomes sick. Chemical-based agriculture plunders the soil in the long term.

The modern fishing industry, in order to increase the already extravagant protein diet available to the North, has to plunder the protein stock once available to the local populations.[50] And India's so-called white revolution (more appropriately, milk marketing, which we shall examine in detail later) has played a similar role in non-coastal areas.[51]

Likewise, development's encounter with forests and forest lands will be seen as a form of barbarism unique to the twentieth century. Entire industries producing paper, synthetic fibre, pulp and wood products have arisen literally on the destruction of irreplaceable virgin forests; under official sponsorship, funded by government and by international banks.

It is here that the true nature of development comes out clearest; the rich natural resources created by nature with great care over centuries, are razed to the ground by agencies which pay a pittance

for it all, and then process and pass off the resources as 'profits'.

This deadly development cannot but have serious negative consequences for communities in the South and their ecosystems. Global economic growth must eventually lead to the destruction of the South's combined ecological endowment, since the majority of the resources it can make available are primary or nature-created commodities. Destruction of forests in the South to produce coffee, strawberries or carnations are good examples.

The development process directs the economy away from meeting the basic needs of people, and compromises their rights to the resources they have enjoyed at every stage. This process can only be expected to accelerate: the demands of the industrial countries for raw materials, the relentless pressure on international financial capital to expand, the pressure on the South's ruling classes to create more jobs in the modern sector as politicisation intensifies, are all contributary factors to this scenario.[52]

The basic distortions of ecology introduced by colonialism in the three continents of Asia, Africa and Latin America and involving the subordination of their combined resources to the continued growth demands of international capital and the living standards of people in the North, have not been eliminated by political independence. They can only be removed by destabilizing the development project.

2

Development and *Himsa*

Much of the pain documented under the labels of triage and plunder in the first chapter has been generated by the specific industrialization model adopted by the ex-colonial societies and their governments under the temptation of the West.

In fact, élite groups from the West directed major initiatives and policies in critical areas such as agriculture, energy and ecology, in addition to industrialization strategies. Spectacular successes appear to have followed such interventions, so much so that those who had masterminded them courageously described the new trends as 'revolutions'. Thus a term ('revolution') hitherto reserved to describe a radical political restructuring of society was appropriated to christen basically conservative undertakings.

One of the most dramatic and impressive of these developments has been associated with the package of practices known as the Green Revolution.

The Green Revolution

On the 26 January 1986, one of the country's leading magazines, the *Illustrated Weekly of India*, ran a cover story on 'Hunger', and the fate of a 100 million Indians caught in an anxious state of drought, famine and starvation.[1] This is twenty years after the launch of the Green Revolution, advertised the world over as one of India's outstanding achievements. Ironically, the country had 29 million tonnes of foodgrains, mostly wheat, in its storehouses at that time.

These conflicting images of large food surpluses, 'revolutionary' production technology, and hunger have a common basis: the application (in many cases, imposition) of western agricultural science, inspired by western (agribusiness) capital, to an environ-

ment that had once not only raised its own competent agricultural tradition, but also a population immensely talented and interested in agriculture. An alien model of development, of handling nature and society, fashioned originally in a western context, was used to straitjacket diverse socio-geographical, bio-regional phenomena that had evolved in response to different specific environments all over the South.

We must recognize that after the industrial revolution, the emerging global system decreed a subordinate, dependent role for the rural areas of the western economies. In future they would possess a purely instrumental role. The countryside would be regarded either as plain raw material or as a factory for urban-biased production, and no longer as an environment in itself or for itself, even as a habitat for human communities.

The development of modern agriculture in the West eliminated the very concept of a village, of rural habitats and communities, substituting for them a form of depersonalized industrialized farming that has very little in common with our own societies today. It stands to reason that the expansion or imposition of this industrial model on our societies would generate a fresh level of violence.

Twenty years is an adequate time span for a rigorous analysis of agricultural development under the Green Revolution label, which claims having enhanced productivity compared with earlier forms of food production. And the data are startling indeed.

The most elaborate analysis of data concerning the Green Revolution has been made by Dr J. K. Bajaj, a former Fellow of the Indian Council of Social Science Research (ICSSR), New Delhi. He asserts that the rate of growth of aggregate crop production is lower in the 1968–78 period than in the pre-Green Revolution phase (1950–65). While total agricultural production rose at a compound rate of 3.20 per cent per annum in the 1950–65 period, it declined to 2.50 per cent per annum in the Green Revolution period.

Dr Bajaj is ready to consider that this declining trend could have been partly due to the declining availability of additional area to be brought under cultivation. But he also demonstrates that the rate of growth in yield (production per unit area) itself declined.

Thus, while the aggregate yield rose at a rate of 1.60 per cent per annum during the period 1949–65, the increase was only 1.40 per cent per annum during 1967–78. 'On disaggregation of these

figures into foodgrains and non-foodgrains,' he writes, 'we find that while for foodgrains there is a slight decline in the rate of growth of yield, non-foodgrain shows a slight improvement. Yet High Yielding Varieties (HYVs) were supposed to have revolutionised foodgrains production!'[2]

TABLE 2.1

COMPOUND RATES OF GROWTH

	Production		*Area*		*Yield (% per annum)*	
Crop	1949–50 to 1964–5[a]	1967–8 to 1977–8[b]	1949–50 to 1964–5[a]	1967–8 to 1977–8[b]	1949–50 to 1964–5[a]	1967–8 to 1977–8[b]
Foodgrains	2.98	2.40	1.34	0.38	1.61	1.53
Non-foodgrains	3.65	2.70	2.52	1.01	1.06	1.15
All crops	3.20	2.50	1.60	0.55	1.60	1.40
Rice	3.37	2.21	1.26	0.74	2.09	1.46
Wheat	3.07	5.73	2.70	3.10	1.24	2.53
Pulses	*1.62*	*0.20*	*1.87*	*0.75*	*–0.24*	*–0.42*

[a] Gleaned from NCAR, 1976 (Vol. 1, Ch. 3, pp. 230–41.)

[b] *Estimates of Area and Production of Principal Crops in India, 1978–9.* Directorate of Economic Statistics, New Delhi.

SOURCE: *PPST Bulletin*, Nov. 1982, Vol. 2, No. 2, p. 97.

Could the decline in the growth rate of aggregate yield have been due to the law of declining marginal productivity? The usual argument proffered is that productivity during the years before the Green Revolution had reached saturation level, and that if the new technology had not been introduced, the rate of growth of productivity would have plummeted. Dr Bajaj refutes this argument since there is no evidence of a declining trend in productivity growth rates in the years preceding the Green Revolution. The data in fact indicate quite the opposite.

If we take the third plan period (1961–2 to 1964–5), which immediately precedes the years when the decision to implement

the High Response Varieties (HRV) package was made, we find that productivity had reached an all-time high rate of growth. The productivity growth rate during this period was 2.7 per cent per annum compared to the annual growth rate of 1.4 per cent and 1.8 per cent achieved during the first and second plans.

Thus, notes Dr Bajaj, the productivity graph was actually moving *upwards* in the years immediately prior to the Green Revolution. During the fourth plan (1969–70 to 1973–4) however, i.e. the period immediately following the introduction of the HRV package, we find the rate of growth of productivity has actually plummeted to an all time low of 1 per cent.

TABLE 2.2

Plan-Wise Compound Growth-Rates of Agricultural Production, Area and Yield[a]

Plan Period	*Agricultural Production*	*Area Under Crop*	*Yield (% per annum)*
First Plan (1951–2 to 1955–6)	4.1	2.6	1.4
Second Plan (1956–7 to 1960–1)	3.1	1.3	1.8
Third Plan (1961–2 to 1964–5)[b]	3.3	0.6	2.7
Fourth Plan (1969–70 to 1973–4)	2.2	0.8	1.0

[a] Plan-wise growth rates have been calculated on the basis of triennial averages with the base and last year of each plan as the mid-years, except for the Third and Fourth Plan when instead of the triennial periods the years 1964–5 and 1973–4 respectively were taken as the end periods, to avoid including especially bad years at the end.

[b] 1965–6, being an exceptionally bad year, has been excluded.

Source: NCAR, Vol. 1, Table 3.16, 1976.
PPST Bulletin, Nov. 1982, Vol. 2, No. 2, p. 99.

A closer look at the achievements of the Green Revolution is therefore required. We need to focus on some hitherto undisclosed

and poorly advertised aspects of such an 'agricultural system'. There are more surprises in store.

First, the Green Revolution turns out to be essentially a 'revolution' in the production of a single commodity: wheat. The wheat output alone rose spectacularly from 6.8 million tonnes in 1949–50 to 12.2 million tonnes in 1964–5, 16.5 million tonnes in the first year of the Green Revolution (1967–8), 26 million tonnes in 1971–2, 35 million tonnes in 1978–9, 38 million tonnes in 1983–4 and 54 million tonnes in 1988–89. In other words, the Green Revolution can legitimately be described as a 'wheat revolution'.

Likewise, Dr Bajaj notes, the increased productivity of wheat was achieved by undermining the productivity of other equally important crops, thus bringing into imbalance certain desirable features of the pre-Green Revolution agricultural system. He observes that in 1950–1, of the total grain production of 52.58 million tonnes, 21.81 million tonnes was rice, 6.34 million tonnes wheat, and 8.33 million tonnes, pulses. In 1963–4, when production had increased to 83.38 million tonnes, the balance between the three main crops was still maintained: 36.17 million tonnes rice, 10.96 million tonnes wheat and 11.34 million tonnes pulses.

After the Green Revolution, in 1970–1, we find wheat production jumping from 10.96 million tonnes to 23.44 million tonnes, while rice moved from 36.17 million tonnes to only 41.91 million tonnes, and pulses remained static. The share of wheat in total foodgrains production rose from a mere 13 per cent in 1963–4, to 22 per cent, at the cost of rice, pulses and other crops. While the yield of wheat rose by 62 per cent, the yield of rice and pulses remained almost unchanged.

Already in 1971, Ashok Thapar, writing in the *Times of India* (22 June) had observed:

> Paradoxically enough, the spurt in the production of foodgrains has in many ways only aggravated the problem of malnutrition. There has been a 16 per cent drop in the production of pulses, an important source of protein in vegetarian diets, as more and more pulse growers have switched to the more profitable cereal crops.

The point to make at this stage is that rice, and not wheat, is the principal crop of India and Asia. Yet, according to even an official working group headed by an Additional Secretary in the Ministry of Agriculture, K. C. S. Acharya, the growth rate of rice in the post Green Revolution phase has been less than it was in the preceding

period. So much for what the Green Revolution has accomplished for Asia's most important crop!

The reason for this unbalanced growth between wheat and rice suggests Dr Bajaj, 'is simply that the Western countries, where the new technology evolved, are no rice-producers.' Complaints about rice shortages have been met by unsolicited advice from Indian politicians that people should now learn to eat wheat. In 1978, Literacy House, a branch of World Education Inc. in India, published an adult literacy primer which proclaimed:

> Eating just rice has a bad effect on health.
> Eat eggs to make up for protein deficiency.[3]

In what could be termed an extreme case of Taylorism, an entire population and culture raised on rice was being educated to change and adapt its tastes to this new achievement of western-inspired, western-directed agricultural science in India: wheat.

The second major point to be made about the Green Revolution is that it has been a prohibitively expensive proposition for what are considered basically poor countries. Before its advent, the import of chemical fertilizers was marginal. Most of the resources required for agriculture came from the agricultural sector itself. The Green Revolution changed all that drastically. The chemical nutrients used in Indian agriculture jumped from 7,85,000 tonnes in 1965–6 to 44,97,000 tonnes in 1978–9, to 84,74,000 tonnes in 1985–6 and 110,36,000 in 1988–9. Imports increased from 334,000 tonnes for the period 1961–6 to 19,93,000 tonnes in 1978–9 to 36,24,000 tonnes in 1984–5. Oil and fertilizer imports were soon constituting 75 percent of imports and greedily using up a major chunk of scarce foreign exchange. Naturally, this could only distort the direction of the economy and powerfully disorient it from meeting people's basic needs.

Achieving self-sufficiency in food has immense propaganda value. India is considered a successful example of food sufficiency being achieved through the use of modern technology. Closer scrutiny indicates something else. Dr Bajaj has suggested that the price of nitrogenous fertilizer on a rough average remained around three times the price of wheat for the decade 1967–76. Since, on average, 0.72 million tonnes of nitrogenous fertilizer were imported per annum, one could easily suggest that these imports were equivalent to the import of 2 million tonnes of grain per annum,

implying thus that wheat imports in the post Green Revolution decade had actually increased by 50 per cent!

TABLE 2.3

USE OF INPUTS IN INDIAN AGRICULTURE

Year	*High Yield varieties (million ha)*	*No. of farm (tractors)*	*Fertilizer consumption 1,000 MT pure nutrient*		
			N	P2O5	K2O5
1965–6	0	31,000	575	133	77
1966–7	1.9	55,000	738	249	114
1967–8	6.0	75,000	1,035	335	170
1968–9	19.2	90,000	1,208	382	170
1969–70	11.4	100,000	1,356	418	209
1970–1	15.3	120,000	1,479	541	236
1971–2	18.0	143,000	1,798	558	300
1972–3	22.1	173,000	1,840	581	348
1973–4	24.4	200,000	1,829	650	360
1974–5	27.0	227,600	1,766	471	336
1975–6	30.0	251,000	1,909	373	227
1976–7	34.5	271,800	2,352	643	337
1977–8	33.0	292,700	2,813	773	483
1978–9	42.0	310,000	2,986	951	560
1979–80		410,000	3,500	1,150	610
1980–1	43.0	473,000	3,680	1,210	620
1981–2		520,000	4,070	1,320	670
1982–3	49.9	597,000	4,220	1,440	730
1983–4	53.7	663,000	5,200	1,730	780
1984–5	58.7	740,000	5,480	1,890	840
1985–6	55.4	822,000	5,661	2,005	808
1986–7	56.1	899,000	5,773	2,105	860
1987–8	54.0	979,000	5,668	2,163	865
1988–9	60.1	1.070,000	7,246	2,722	1,068
1989–90	66.8	1,177,000	7,900	3,400	1,200

NOTES: India's total farm land is 140 million hectares.
P2O5 = Phosphate fertilizer; N = Nitrogen fertilizer; K2O5 = Potash.

SOURCES: Government of India, *Economic Survey 1974–75*, New Delhi, 1975; *India 1980, A Reference Annual*, New Delhi, 1980, p. 214; Balu-Bumb, IBRD, *A Survey of the Fertilizer Sector in India*, Washington, 1980, pp. A 76, A10; FAO, *Production Yearbook 1979*, Rome 1981, p. 262; FAO, *Fertilizer Yearbook 1979*, Rome, 1980, p. 87; *Basic Statistics Relating to the Indian Economy*, Vol. I, August 1990, CMIE, Bombay.

Today's Green Revolution, like its western counterpart, cannot be maintained without massive subsidies. The subsidy on fertilizer alone has reached Rs 2,000 crores and is expected to touch Rs 5,000 crores by 1990. In terms of consumption, further subsidies of Rs 800 crores are required so that the prices of essential commodities like wheat and rice are controlled and remain within the reach of at least the vocal, urban groups. The extensive public distribution system of fair-price shops functions well only in the cities where it serves even those who are affluent enough to be able to purchase their food in the open market. Migration, corruption and abuse prevent the majority of the really poor from utilizing their ration cards.

Thus it is not at all surprising that one major consequence of the Green Revolution (which, we are assured, is a revolution in food production) has been its negative impact on nutritional levels.

The new cropping pattern has also displaced the cheaper millets and pulses on a massive scale. The availability of pulses per head per day has come down from 64 grams in 1962 to 58 grams in 1964, 48 grams in 1971, 45 grams in 1976 and only 40 grams in 1979.

Similar situations have arisen elsewhere in the South where a similar pattern of production was introduced. The example of Thailand is singularly damning. From 1970 to 1980, rice production in Thailand increased by 31 per cent, but exports increased by 263 per cent. This led to a decline in food availability for the Thai population by 18.5 per cent. The energy intake of the average Thai from rice averaged 1,547 calories from 1961 to 1965, reached a peak of 1,662 calories in 1968, and fell to 1,384 in 1977, so that in 1978, this so-called 'rice bowl of Asia' had poor farmers robbing trucks and trains to solve their problems of hunger.

Likewise in the Philippines. For instance, the high prices of Green Revolution inputs have set farmers in the Philippines, home of the International Rice Research Institute (IRRI), against the HRVs, and against the continued existence of IRRI itself.

An analysis of the real income and expenditure from rice culture in the Philippines, done by the ACES Foundation, shows that although farmers were producing 72 per cent more in 1981, they were in fact earning 38 per cent less, because of the phenomenal increase in paid out expenses necessary to maintain their HRVs, in addition to the falling prices of paddy. At constant 1970 prices, the farmer's net income of Peso 1,212 in 1970 had decreased to Peso 747 in 1981.[4]

Raising nutrition standards of the majority of the population was the ostensible objective of the Green Revolution.

The Green Revolution, finally, cannot be separated from the issue of pesticides. If pesticides are not routinely used, the HRV package fails. The indiscriminate use of pesticides, most of which are banned in the industrialized countries, has become part of a cynical game resulting in the death of thousands of people every year, merely in their application, a fact noted in the first chapter of this book. I have already drawn attention to the fact that the Sevin manufactured in Union Carbide's Bhopal plant was an essential component of the Green Revolution technology.

The defenders or inventors of the HRV package refuse to acknowledge this. Norman Borlaug recently said there was no need to make a fuss about pesticide poisoning deaths since more people died in automobile accidents than in farming operations.

The problem of pests and the issue of germplasm conservation bring into sharp focus the true nature of western science and its severe limitations as a tool of genuine transformation in other environments. In order to distinguish itself from traditional technology, the new technology must first attempt to produce some spectacular successes. In doing so, it must constantly ridicule and disparage the basis of the older agriculture, the *traditional cultivar* (the latter, the result of close trial and error experimentation and selection by farmers over decades). It must also actively seek to displace the traditional cultivar with its own product: the High Response Variety (HRV) of seed.

However, since the HRV is not closely adapted to any environment and readily invites pest infestations on a massive scale, it requires extensive logistical support. Protection can eventually only come from the same traditional cultivars, which at the time of HRV propagation and advertisement, were loaded with abuse. When an HRV incorporates pest-resistant genes from the older cultivars, however, it becomes very much like the traditional cultivar itself, and also commences to lodge. This was one of the principal arguments used against the traditional tall rice varieties.

The strategy of incorporating resistant genes is also of temporary utility: nature is quick to respond with the necessary mutations as fast as scientists fabricate new plants. In addition, it has led to a degree of unimagined centralization. In the late 1970s, blast disease hit South Korea's modern varieties. It was only in 1981 that 105

tonnes of seed, with blast resistance incorporated in them, could be air-lifted from Manila to Seoul.

In such development, we see how critical and life-threatening the Green Revolution has become. Is this the proper path to the future? In times of deep stress can one always be confident that the IRRI or CIMMYT will succeed in identifying and incorporating new genes, and in airlifting seed for such emergencies? Is such 'emergency agriculture' necessary ? If IR 36 is now planted over 10 million hectares, as the IRRI boasts, what happens when a pest mutation begins to take the plant apart? How do we manufacture seed for such an infinitely large area?

In addition, the political costs of this strategy have not even been fathomed. A copy of all the valuable rice germplasm collected from the South is now lodged in Fort Collins, USA, courtesy IRRI's Ford and Rockefeller Foundation connections. Fort Collins is the maximum security installation of the United States Government for germplasm material. The US is only marginally a rice producer. In the not too distant future rice-growing nations might have to go to the US for rice germplasm, with all that this implies for their foreign policy.[5]

Are there any alternatives? When we set out to examine that possibility, we discover another ubiquitous feature of modern science—its belligerence. There is ample evidence to prove that the consolidation of the IRRI as the world's premier rice research centre demanded the successful de-stabilization of all autonomous, nation-based rice research programmes. The clearest case in point is India, where the new IRRI varieties, TN 1 and IR 8 were brought into the country against the advice of Indian scientists who had discovered that the dwarfing gene dee-gee-wo-gen was susceptible to a range of diseases never before seen on the Indian subcontinent.

A leading rice specialist was removed as Director of the Central Rice Research Institute at Cuttack because he objected to the IRRI Director bringing in rice seeds without a quarantine certificate.[6] The counter-productive IRRI strategy, based on semi-dwarf varieties, has been maintained despite more promising and less hazardous routes to productive rice research. Indian scientists are now belatedly discovering much higher-yielding plants bred by farmers within the country than have been produced by either CIMMYT or IRRI.

Eventually, to whom did the Green Revolution bring bountiful harvests? To those who designed the project, including American private foundations like Ford and Rockefeller; multinational corporations, who manufactured the seeds, equipment and nutrients; the banks, who provided the credit and certain categories of very large farmers. For all of them it was a revolution beyond expectations, for it gave them legitimacy in their drive to uproot subsistence agriculture and supplant it with a system which would always require both their inputs and their constant advice and presence. It is appropriate to recall that the very term, 'Green Revolution', was first used by William Gaud, administrator of USAID in 1968.

Yet, few of these designs and policies would have made headway if there had been no corresponding desire or pressure for such results from the South itself. To this aspect, we now briefly turn.

Before the mid-1960s, agricultural production within India remained largely independent of inputs external to the agricultural sector. Agricultural output increased nonetheless, due to increasing irrigation facilities and some land reforms. The increased food output did not, however, come into the market because, as Dr J. K. Bajaj reasons, the cultivators were simply eating more, after many decades of colonially induced malnutrition.

This development caused India's political élite no small distress. Thus the National Commission on Agriculture (NCA) observed: 'The unique features of the food situation during the Second Plan period were the increasing demand for foodgrains and a steady decline in market arrivals *despite higher production*.' (Emphasis added).[7] The necessity for industrial intervention in agriculture was therefore quite clear. Bajaj quotes the NCA:

> The entire industrial sector depends heavily on the supply of food from the agricultural sector. Since a sizeable part of the wages of the industrial worker is spent on food items a sustained supply of food from the agricultural sector is a necessary condition for stability in the industrial sector.[8]

The official response was to concentrate efforts to increase production in a few areas which were already surplus. The results were dismal, till the advent of the HRVs of seed in wheat and rice turned the tide. These seeds however made agriculture critically dependent on industrial inputs in the form of fertilizers, pesticides, expert advice and credit, and all these factors combined to guar-

antee that the farmer would be forced to unload his stocks on the market.

This development strategy of subordinating agriculture to the requirements of industrial growth had its own chain of far-reaching consequences. As Bajaj points out, it poured most of the country's finances budgeted for agricultural transformation, into a few well-endowed areas—notably Punjab and Haryana—and starved the rest of the country's food-producing regions. Naturally, yields in the latter areas began to deteriorate.

Area to area disparities were paralleled by crop to crop disparities. We have seen how wheat and rice got the major attention, whereas output in the areas of pulses, oil seeds and the coarser millets stagnated and then declined. Development next restricted the options of the majority of the country's population, compelling them to eat wheat instead of rice, or to give up superior proteins like pulses and dals for cheaper but damaging varieties like kesri, the consumption of which causes lathyrism, a disease in which people get crippled below the knees.

The other distressing feature of agriculture in the post-Green Revolution phase concerns its contribution to increasing social inequality. One of the forms this took was land alienation—which Bharat Dogra has called 'land reforms in reverse'—displacement of tenants, marginal and small farmers by richer peasants. The Green Revolution effectively drove them into indebtedness. Dogra notes that during the decade 1964–5 to 1974–5, 'while the number of rural households as a whole increased by 16.6 per cent the agricultural labourer households increased by over 35 per cent.'[9]

C. T. Kurien's *Dynamics of Rural Transformation*, a study of the changing agriculture of Tamilnadu, observes that 'apart from the census definitional changes, there must have been a decline in the number of cultivators in Tamilnadu and an increase in agricultural labourers.' Kurien speaks of 'small farmers in the new quiet structural transformation leaving land and farming and joining the ranks of the rural proletariat.'[10]

Dr Bajaj lists the salient features of the development of modern agriculture in the South thus: decline in aggregate growth; increased production in localized areas at high cost of often imported resources; decline of production in less favoured areas; and control of production by a small sector.[11]

If all this has not been immediately obvious, it is because

advertising is one of the new resources constantly used by modern development. Advertising in fact forms an essential component of most programmes associated with modernization or modern science. Thus, high-sounding social and humanitarian objectives such as 'feeding the poor and hungry', 'increasing population' are used to legitimize technologies like the Green Revolution which require huge contributions from the public exchequer and equally heavy investments in fertilizer plants, pesticides and equipment.

This need not be lengthily documented. Even a superficial reading of the literature concerning the need to enhance food production, whether from the Ford and Rockefeller Foundation Annual Reports of the late 1950s, or Government of India Plan documents, or even UN organizational literature, say from the FAO itself, would prove the extensive use of 'social' objectives to legitimize more 'development'.

As the technology is capital intensive, farmers are sold the system on the grounds that they can make huge profits and improve their living standards. Banks get involved on a similar basis.

Once the food is produced with the socially legitimized new technology, we are informed that the system is not responsible for seeing that people are now fed.

The distribution of food raised through social investments is now given over to market forces which of course cannot meet hunger, for it requires cash to enter the market, and poor people have no cash.

The White Revolution

Planners in India admitted these distortions, but saw the way out not in necessary land reforms or alternative technology but in advancing the cause of a new supplementary, capital-intensive industry for the rural proletariat—*dairying*. The National Commission on Agriculture (NCA), for instance, clearly saw dairying as an answer to the problem of inequality engendered by Green Revolution technology.

The gains of the Green Revolution, noted the NCA,

> flowed towards the progressive farmers who also happened to be those with larger holdings having irrigation facilities. Farmers with similar holdings and poorer means have, by and large, had to be left out. This resulted in one kind of major imbalance in the rural areas. As a large

> proportion of the rural population could not share the economic benefits resulting from this new strategy of agricultural development, a strong feeling of dissatisfaction developed among the less affluent farmers, giving rise to social tension in the rural areas. Social justice demands avoidance of such imbalances. It is not desirable to have growth without social justice and this points to the need for an integrated development of all sections of people in the rural areas by reducing the present widespread poverty, unemployment and underemployment. In our efforts to achieve this objective in the rural areas, intensification of cattle rearing and milk production programmes can play a vital role.[12]

Predictably, reliance on western dairy technology and dairy experts seemed to be the only attractive instrument to achieve this. The Indian dairy science establishment is, in fact, one of the most ludicrous transplants ever attempted by foreign science. It has helped produce apparently 'successful' results by aggravating not just the ill effects of the Green Revolution, but by threatening long-term ecological instability as well.

The western livestock industry is an autonomous system of production devoted almost wholly to the milk and meat business. It demands, and has been given, an agricultural niche that is fully oriented to the feeding of animals for milk and meat. The high yields of European cows would not be possible without large quantities of feed raised on prime agricultural land in the South. The high yields are therefore associated with a greater demand on the environment in terms of energy and food. It is important to keep these elementary facts in mind.

In a country like India, on the other hand, milk is a by-product of a resource use system in which animals are maintained primarily for draught, not milk. Most important, they are fed on a diet of agricultural crop residues that are inedible by humans.

It should also be noted that over the centuries farmers and pastoralists have helped rear and develop indigenous breeds of cattle serving the dual purpose—of providing milk and serving as draught animals. For instance, the Mysore breed, Amrut Mahal, was, as its name suggests, literally a 'milk mansion', but the males were also useful for draught. The point to emphasize is that 'dairying' in India has worked on principles of *symbiosis* and *harmony*: animals and human beings exploit different niches connected to the same production system. They do not compete for the same food but subsist exclusively on different parts of the same plant crop.

The modern Indian dairy science establishment was set up by the British. As in other spheres, the entire foreign system was imported. Scientists experimented to produce milch animals which had no obligation to agriculture and which demanded food grown on land used to raise grain for human beings and concentrates that directly used cereals. The relation of complementarity and symbiosis was sought to be replaced by a new relation of competition and conflict.

The basis for this radical development was a false comparison between the milk productivity of European and Indian cows. Since the Indian cow was bred for both milk and draught, it was inevitable that in any comparison in milk yields alone the Indian animal would seem less productive. No one compared the draught potential of the two breeds. If that had been done, the Indian breeds would have emerged in a far better light. The low milk yield of the Indian breeds became the excuse for seeking exotic germplasm on a major scale.[13]

Every study, including the *Report of the Committee of Experts on Exotic Cross Breeding of Cattle in India*, unequivocally documents, in case after case, the incompetence of exotic cross-bred bulls for draught.[14] At one point, Indian planners had naïvely decided that this would not be a serious problem, as Indian agriculture would eventually be tractorized following the American model. This assumption proved to be totally erroneous.

Today, thousands of cross-bred bull-calves are whisked away daily by butchers or left to die because farmers do not want to waste their resources on them. When confronted with the problem of these bulls' incapacity to work in the tropical heat, western-trained agricultural scientists have blandly suggested that farmers should complete their ploughing operations during the night![15]

Secondly, exotic animals do not have the resistance to disease, the ability to withstand drought and the capacity to browse that the Indian breeds have. Eventually, due to these susceptibilities, they are incapable of realizing their full genetic potential. In the long run they are subject to the same pressures that Indian breeds face, but have much less confidence and ability to withstand them. Add to this the general shortage of fodder, and it is axiomatic that the milk yield will be generally poor, regardless of their genetic superiority.

The image we have of European cows is not very dissimilar from

the image we have of European people. They are seen to be attractive because they hold the key to undreamt of forms of productivity and profitability. We are equipped mentally to see the European cow, with its average output of 75–100 litres per day, as a wonder toy, a milking machine, a turn-key project. We can see money pouring in and we can hear cash registers ring.

Modern economics has a way of turning a society's more hallowed ideals inside out. Should the cross-bred cow refuse to produce what is expected of it, the farmer loses interest in it and begins to ill-treat or maim it or even to starve it to death, so that he can collect the insurance. As a result of this trend, insurance companies have become extremely cautious about insuring cross-bred animals today. Within the last ten years or so, claims on such animals have been unnaturally high.

The killing of such animals is justified by the Hindu psyche in intriguing ways: the exotic cow is not seen as an *Indian* cow which, of course, is sacred, and cannot be killed. This is not to say that all European cows are ill-treated in India. Farmers are known to take care of successful yielders quite well, providing them with luxuries that are denied even to their closest family members! For example, a few farmers have installed air-conditioners or fans for their exotic stocks.

The reader may find such innovations ridiculous and amusing. But animals from a temperate climate will function best in tropical climates when they are placed in simulated temperate environments. Even so, the actual average increase in milk from these exotics is so marginal (since their management—and inputs required—do not generally meet the genetic potential) that one must seriously question whether the investment and research was justified, and whether better results could not be obtained by relying on selective breeds of Indian vintage. We often forget that these exotics are themselves the result of selective breeding in their home countries.

Efforts should have been made to strengthen the indigenous system instead of disrupting it, considering its ingenuity in dealing with the critical problem of scarce fodder resources. Instead, the policy of relying on exotics became integral to the 'white revolution' optimistically labelled Operation Flood. It is to this revolution, another elaborate exercise in development duplicity and deceit, that we now turn.

The Operation Flood (OF) project, based on the premises of dairying as the NCA wished, provides an additional dimension to the industrialization of rural areas. The 'white revolution' it promised was more specifically dependent on foreign technology than the Green Revolution whose inadequacies it sought to remedy.

A brainchild of India's largest agribusiness co-operative, the Amul complex at Anand, Gujarat, OF promised policy makers a dynamic dairy industry modelled on the western pattern. Aid would come from the European Economic Community (EEC) via gifts of skim milk powder (SMP) and butter oil (BO), which, sold in the form of reconstituted milk in India's cities, would raise the funds to set up dairy plants. The rest of the strategy was market-oriented development: if one established a milk plant in any area, argued the project authorities, *and* offered a good price for the milk, farmers would themselves invest in milch animals and feed, produce more milk and sell it to the plants. Thus milk production would automatically increase.[16]

Of all development projects, OF was unique in that it maintained a separate, lush advertising account. The project was billed 'the world's largest dairy development programme', and at various periods during its execution, project authorities would claim this 'revolution' had solved one or the other, if not sometimes all, the problems associated with rural poverty: caste discrimination, gender inequality, backwardness, even family planning. For the cities, where India's articulate, educated ruling classes live, the project promised a 'flood of milk'—veritable cities of milk and honey.

Evidence available goes to show that the project authorities cultivated and manipulated the media from the inception of the project. The reason? They contemplated aims other than the social objectives the project was purportedly designed to meet.

The execution of the OF project remained securely in the hands of Amul managers and politicians. The project benefited their giant co-operative much before it did farmers elsewhere in the country. Project funds enabled Amul to expand its operations dramatically and to tighten its control over the nation's milk market.

The EEC had its own reasons for associating with OF. The project gave the EEC a new position of dominance in the Indian market in relation to the New Zealand and US dairy trade, and

later, even a promise of exporting the same 'revolution' elsewhere in the South. Both Amul and the EEC were ultimately successful in cloaking the project's real nature—the expansion of Amul's markets, and the dominance of the EEC in India—in a cloud of high-falutin objectives.

The first major piece of duplicity concerned the project's aims—the promise to increase the per capita milk consumption of the population. This was in fact stated as the rationale for inaugurating the project in the first place. 'The development of animal husbandry will also provide the milk required for the population of whom 35 to 40 per cent are vegetarians and whose only source of animal protein is in the form of milk and milk products.'[17] Such objectives were repeated explicitly in 1977 when OF II was prepared for the Government's clearance.

In fact when Raymond Crotty, an Irish dairy expert, wrote an article in the London *Times* suggesting that milk was an expensive commodity and that India should concentrate on cheaper cereals and pulses, the National Dairy Development Board (NDDB) haughtily replied:

> This argument, often raised now, is more academic than realistic. It must be realised that milk and milk protein products are the only source of animal protein for the 35 to 40 per cent of 630 million people living in India who are vegetarian. It has been found that even non-vegetarians need milk and milk products to supplement and enrich their diets.[18]

The necessity for government involvement in dairying on such a large scale needed legitimacy. If the government saw the project as a mere device to provide an opportunity for Amul to generate funds for its mammoth expansion programme through EEC aid, or to transfer milk from one class of the population to another, it might deny it had any useful 'development' purpose. It would then have been difficult to get official clearance for the project, much less Government's involvement. Though OF I was not part of the budget or Plan expenditure, OF II was, a status it would never have attained without such 'developmental aspects'.

The strategy to induce the farmer to produce more milk failed (for reasons analyzed elsewhere). In order to save face, the authorities had to invest in tankers to collect milk produced wherever possible, even from villages in the remote hinterlands.

In the cities, expensive milk-processing technology pushed the price of milk out of the reach of all but the rich. Thus a project

legitimised by the promise of making milk available to everyone, deprived the rural population of milk, as was seen when village milk producers exchanged the precious commodity for cash. Similarly, the commodity was priced out of the reach of the poorer urban population. It did produce a 'flood' of milk and milk products (some fifteen different categories including chocolates and cheese) but only for India's affluent classes and later for export. Thus did the world's most ambitious dairy development programme turn in on itself.

By 1983, the NDDB was preaching what Crotty had suggested in 1976! By 1983 too, all OF's undisclosed objectives had been achieved, including Amul's access to a Tetrapak machine to market milk all over the country from Anand, and a two crore rupee pipeline to carry gas from the Baroda oil refinery to the Amul complex.

Nothing would change now if the authorities openly acknowledged their true intentions. By 1985, the Indian Dairy Corporation was openly declaring that milk was not something everyone must consume. Being an expensive form of protein, it was only for the rich. The poor should spend their money on consuming more appropriate 'cereals'.[19]

By this time even official Government policy would support the arguments that the NDDB had fabricated, justifying a dietary apartheid between the two classes of the Indian population, rich and poor. The L. K. Jha Committee appointed by the Government to examine the performance of OF II went out of its way to sell the NDDB arguments to the public.[20] Yet nobody could explain why the Government of India should waste scarce public funds in a programme designed to enrich the more than adequate diet of India's rich.

As development, OF produced serious ill-effects on nutrition standards and on employment. Prior to inauguration of the project, a large quantity of the country's fluid milk was converted into butter fat (*ghee* or clarified butter) and the residue, buttermilk, rich in lactic acids, was distributed free in the village. The *ghee* was produced by village women and tribals using simple appropriate technology. *Ghee* production was an intrinsic part of village life and its pattern of consumption tailored to rural conditions. (*Ghee* could be stored without going rancid for months: ideal for consumption during the monsoons).

Operation Flood destroyed this cottage industry wherever it could, by buying up as much liquid milk as possible, and centralizing *ghee* production in large-scale, capital-intensive plants, thereby reducing more village labour to idleness and depriving the poorer people of nutrients. No thought was given to the fact that in a labour-surplus economy, one does not use technology to create and increase unemployment.

The failure of the OF project to enhance milk production through its policies, a fact underlined by the Jha Committee, was sought to be urgently compensated through even more egregious methods. Dairy authorities now began to consider the import of cross-bred cows *en masse* from Europe and America. Developments in those countries had forced their authorities to order farmers to *reduce* milk output, possible only by physically eliminating large numbers of cows. Why not transport these cows to India instead of slaughtering them? By 1984, newspaper reports spoke of efforts to relocate 20,000 to 1,00,000 of these cows in India.[21]

The initiative came allegedly from an unemployed princess (Irene) from Spain, a devotee of the Shankaracharya of Kancheepuram. It did not come from the Animal Husbandry Department of the Government of India, which, in fact, had circulated a note against the import of stock. A few dairy scientists defended the import on the grounds that it would improve Indian herds, forgetting that dairy herds are not improved though cows, but sires.

The National Dairy Development Board (long nicknamed the European Dairy Development Board) organized the distribution of these imported animals among farmers at a price. The NDDB in the recent past had admitted that its policy recommending cross-bred cows to the disadvantage of indigenous breeds needed to be corrected. Being privy to much research on exotic animals, the Board would obviously have had sufficient evidence of the unremarkable output of such animals.

There was, in addition, a dramatic exhibition of such evidence. B. S. Baviskar reported in 1980 in the *Economic and Political Weekly* that more than 200 members (of the Amul Cooperative) had bought Holstein-Friesian cows at a high price from Amul which the latter had received as a gift from Canada.

The members launched an agitation to return these animals as they found

them uneconomical to maintain. The agitation continued for some time without any resolution until the members threatened to present the unwanted cows to Kurien's only daughter on the occasion of her wedding reception. At this the authorities hastily agreed to reach a settlement.[22]

The animals that would eventually come to India would not be the best of the European herds. Western economies make a living selling us pharmaceutical drugs, pesticides, milk-powder and hazardous know-how banned in their own countries. It is natural to expect that in the matter of milch animals also, we would be landed with sub-standard cows, or, what in the trade are known as culls.

The maintenance of milch herds which require special feed rations has in turn its own consequences. To produce, for example, the milk of Kaira district, on whose basis Amul stands, a large proportion of the country's cotton-seed cake has to be diverted there. The more we divert scarce cattle feed to concentrated pockets, the less resources we have to feed our local herds, which degenerate further, affecting production as a whole.

Despite being privy to all these insights, the NDDB still went ahead with its scheme to import culled stock from Europe. The first consignment of these animals perished mysteriously in transit, asphyxiated in the hold of the aircraft. Tragic but hardly news. It is not exactly known how many more consignments of these milk-machines eventually reached Indian shores. The NDDB at least no longer talks about them.

The other consequences of such imports were also quite clear. We could be mixing up our livestock gene pools beyond repair, introducing into them genes susceptible to disease. Worse, by such actions we would continue to advertise that the exotic is superior to the indigene.

Indian pure breeds including the Sahiwal, the Gir and the Ongole are displaying their remarkable genetic potential in countries as diverse as Brazil and New Zealand. Our continuing xenophilia compels us to export our best genetic resources at zero cost to economies abroad while simultaneously importing less than the very best and often, mostly questionable and inappropriate sources of productivity from abroad. We have this strange notion that any means of productivity can be trans-located from environment to environment. This may be true of mechanical processes, but biological processes are a different proposition since they do not operate independently of their environments.

All this is not to prepare the ground for a claim that the genetic improvement of our own local breeds will completely solve the problem of our milk shortage. Improvement in milk yields cannot occur without good quality fodder, but it is also true that in the absence of good quality fodders, selective breeding of indigenes is still preferable to cross-breeding, for besides poor food, the exotic animal must acclimatize, must attain immunity to disease and be able to withstand drought. Here Indian breeds have a decided advantage.

Desperately in search of development models to replicate in other parts of the country, India's planners and bureaucrats are willing to close their eyes to development débâcles like O F. Such models are seen as effective substitutes for the carrying out of the more difficult but necessary political reforms that include, for instance, the drastic redistribution of assets and wealth.

Operation Flood presented planners with the 'Anand model' for replication. As Shanti George parodied it in her classic book, *Operation Flood*, the new concept was truly more Anand (joy) than model. In its different elements, the model which emerged for replication was the actual opposite of what had emerged historically in Kaira district over more than half a century. Wrote George:

> The undesirability of this Anand Marg to dairy development emerges when we put together all that the preceding chapters have told us about the dairy planner's misperception of this model he is pledged to replicate. He considers it the future source of the entire urban milk supply when in reality Anand provides only a part of Bombay's officially distributed milk. He associates it with imported technology when milk in the Anand region is produced through indigenous strategies. He describes it as favouring the small producers when in Anand profits increase with the scale of dairying. He calls it a casteless pattern when it is in fact deeply casteist. He sees it as a means to feed those who most need feeding, when the Anand pattern sends milk flowing upwards towards money. He describes it as a procurement network that increases returns to the producer, when it withholds a large part of the profits. He portrays it as easily replicable, despite its contextual specificity.[23]

In her study, George provided a set of consistent arguments to show how the modernization of Indian dairying is set squarely against permanence, ecology, better nutrition and an appropriate use of indigenous resources and strengths. Analysing the inappropriate western model on which it is based, she concluded the

country's interests would be better served if OF failed. India, she said, would be doing a great disservice by promoting this model elsewhere in the South.

The Blue Revolution

Despite the availability of such unambiguously stark and negative feedback, development's revolutions continue to roll relentlessly elsewhere. White and green have been followed by a 'blue' revolution in fisheries where, with the intervention of modern technology, the intake of fish protein all along India's coasts has rapidly declined.

The new fishing technology consisting of mechanized boats and nets was ostensibly introduced to meet the 'protein shortage' of the local population. Once it commenced operations it directed the output (additional fish catches) into the protein-surplus economies of Europe and Japan. As had happened with the other technological interventions, the new fishing technology caused a major ecological disturbance. Its use disrupted the fishing methods of traditional fishermen beyond tolerance and sought to usurp their niche. This led to numerous clashes all over south and south-east Asia.

The 'blue revolution' and the fiascoes that haunt it have been elaborately documented in the work of John Kurien and others.[24] Johan Galtung has provided an excellent obituary for the Norwegian fisheries (NORAD) project tried out in Kerala, in which foreign technology and foreign advice ended up kicking poor fishermen and their families in the teeth.[25]

Interventions in Ecology

If the 1960s saw a 'green revolution', and the 1970s a 'white revolution', the 1980s witnessed a fresh kind of western intervention related to the environment. The South's ecosystems have acquired a new significance for capitalist countries, with western professionals attempting to find 'solutions' for what they perceive as India's (and the South's) most serious environmental crisis.

In fact, an influential consortium of foreign agencies already feels it knows what is best for India's environment, and (which is truly alarming) is already deciding on such matters. Here I include

institutions such as the World Bank and IMF, SIDA, the Ford Foundation, the World Resources Institute, etc. They control vast financial resources, assume they are in a position to tap expert advice on environmental questions, and to prepare projects based on such advice.

As I stated earlier, the environment nexus between the countries of the North and the South has a long history dating to the origins of the industrial revolution with its extravagant ecological demands. In the language of ecology, the industrialization of the West was possible because it used ruthless political power to bend the environment of other societies to its own programme. Even today, for example, some of the most fertile agricultural lands within the South are part of the resources of the industrial countries rather than of the local populations of these countries, with devastating consequences.

Yet, paradoxically, ecology is the new cover for a range of influential policies that further deepen these two-hundred-year old trends. Nothing illustrates the case better than the latest scheme unfolded for the welfare of the South: social forestry.

Social Forestry

In fact, on paper at least we already have another revolution, heralded in terms similar to those used to describe the other revolutions. For ecologists, energy specialists, planners, and those desirous of improving the quality of life in the rural areas of the South, 'social forestry' is the new panacea, the final solution, to the firewood shortage plaguing the rural poor, and to the depletion of natural forests. Social forestry is even advertised as a safe, alternative, ecological approach to rural development.

In India, central and state governments, Indian and international financial institutions, including the World Bank and SIDA, have outbid one another in pumping in funds for the propagation of social forestry schemes. The central government alone set aside one thousand million rupees over a five-year period (1980–5) for growing more trees in the countryside.[26] However, two illuminating studies provide incontrovertible evidence that the social forestry programme has degenerated into the predictable fiasco.

The first, by Jayant Bandyopadhyay and others from the Indian Institute of Management, Bangalore, is titled *The Social, Economic*

and Ecological Impact of Social Forestry in Kolar.[27] The second, by B. V. Krishnamurti, is called *The Deteriorating Eco-Economic Scene in South Mysore.*[28]

Both studies deal with trees. The first examines the social forestry schemes of the south Indian state of Karnataka financed by the World Bank. The second reconstructs a picture of the agricultural ecology of south Mysore (an area in the same state) as it existed twenty years ago, with the focus on the indigenous, socialized forestry of traditional agriculture, and its collapse in the face of modern cash crop cultures. Much of what these ecologists demonstrate is corroborated by independent studies of social forestry schemes in adjoining Tamilnadu, carried out by the Madras Institute of Development Studies. Reports mention similar schemes having gone awry in Uttar Pradesh, Haryana, Gujarat, Rajasthan and Punjab.[29]

The general conclusion is that social forestry is headed the way of the Green Revolution in its disastrous impact on employment, food and ecology. Just as the Green Revolution created surplus food stocks while millions found themselves without the purchasing power to benefit from the new increases, social forestry schemes are leading to a firewood crisis even while thousands of hectares of land are being enthusiastically crammed with trees. In the process, an carlier, less destructive agriculture is separated from its ecological moorings.

The firewood shortage is an effect of numerous causes. The principal one is that the rural population no longer controls the forests in its environment. Access of village populations to natural forests (for fodder and fuel) was denied as these were gradually declared 'reserved' by the British colonial government, and later, by Indian state governments. This increased the population pressure on non-reserved village wood-lots and grazing commons, leading eventually to their total denudation. Today, despite the pious encyclicals of government officials and forest conservators that we protect our forest wealth for ecological reasons, the natural forests are being diverted to industrial use legally and illegally by timber merchants in collusion with foresters and government corporations, under the guise of 'scientific forestry management'.

Trees too have disappeared, as B. V. Krishnamurti points out, because cropping patterns are uncritically altered from polycultures to monocultures, and from an organic inputs base to

chemical dependencies, destroying the symbiotic relationship that has existed between agriculture and silviculture in traditional practices. Trees from forest and field once provided fodder for animals, poles for houses and green leaf for mulch. At that time, animal dung was preserved mainly for the fields instead of being consumed as a fuel, as is prevalent today. Certain tree species like the *honge* (*Pongamia glabra*) were a part of agriculture; others, like the tamarind (*Tamarindus indica*), provided liberal supplies of fruit pulp, a vital ingredient in food preservation. Oil from the *honge* seed was used for medicinal and lighting purposes, as it still is in certain villages today.

Before the spectre of the Green Revolution began to haunt the countryside, traditional farmers in this country, very much like their counterparts in China, rarely planted trees on crop lands. They planted them instead on the bunds that divided the fields, or on the unriveted side of water collection tanks. These trees provided shade, held the bunds in check against erosion, provided *in situ* manure, prevented wind and soil erosion, and stabilized hydrological and soil systems. When old, they were cut down for fuel, for agricultural implements and for bullock carts.

Today, except in certain areas, this situation has ceased to exist. Bandyopadhyay *et al.* point out that nearly 20 per cent of manpower in the rural areas is directed away from productive work to fuelwood gathering. In some parts of the country, two man-days of labour per family per week are spent on the same task. Since fodder trees and grazing lands have disappeared, animals are becoming weaker and their potential for draught or milk has been reduced, leading to poor tillage practices and delayed planting.

The organic content of the soil is no longer replenished with green mulch pruned from trees. Plants denied humus become increasingly susceptible to disease and pests. Thus multinationals producing harmful pesticides and fungicides have made further inroads. Erosion is another widely-recognized consequence, leading to further declines in yield. In desperation the farmer uses extra large doses of chemicals, 'running faster on one leg', as one practitioner described it. Our agricultural scientists, trained in Green Revolution techniques and denied knowledge of earlier organic systems available within their own farming traditions, are oblivious to the inexorable ruin of the soils.

To meet these difficulties, social forestry has been conjured up

as a panacea. The 'social' feature of the forestry is, I imagine, a purely linguistic tool, to co-opt a rural population into a scheme of things where it will have to pay for the fuel which it once got free. Besides, until one has the co-operation of the village people, saplings tend to disappear overnight, or goats and cows help themselves to a free meal. Paid labourers digging pits and planting seedlings do not, in any event, constitute 'community participation'. As for the poor, they know anyway that the final product will rarely reach their *chula*s or stoves.

There is a more revealing indicator of the real objectives of the social forestry 'revolution': the tree selected for this planting jamboree, eucalyptus, provides neither fodder nor fuel, neither green mulch nor shade. In fact, its destabilizing effect on water tables is well known even among foresters. But eucalyptus is also a prime candidate for industrial use and that is the heart of the matter. Passing off the change in land use from food to wood as 'social forestry' was a stroke of genius. The eucalyptus in Karnataka's grand social forestry plan feeds textile and paper mills in the area. Sweden, known for fanatically protecting its own sylvan wealth, has little qualms getting SIDA to finance a social forestry project in Tamilnadu that will eventually benefit WIMCO, the Swedish multinational.

In fact, this is the most disturbing trend in the social forestry 'revolution'. Trees are ostensibly to be grown on waste lands, on road sides, canal embankments or village commons. But these original objectives have now been subverted on a national scale. In Gujarat, the World Bank, the latest pretender to ecological wisdom, planned for 'only' 1,000 acres of private crop land to be under eucalyptus. What happened? In one district alone, some 10,000 farmers switched over irrigated land from food production to eucalyptus. The reason for this, of course, is that it is more profitable to grow eucalyptus than *honge*, tamarind or, for that matter, wheat, rice or ragi. Due to the combined onslaught of eucalyptus and sericulture, the production of ragi, the coarse millet that forms the poor's staple diet, crashed from 1,75,195 tonnes to 13,340 tonnes in three years in Karnataka alone. The land involved is rainfed terrain which was previously used not only for ragi, but also for pulses.

In the near future, under the World Bank project, nearly 12 per cent of such agricultural land in the state of Karnataka is expected

to have eucalyptus grown on it. Ragi may well be wiped off the agricultural atlas, and we shall be faced with yet another form of severe malnutrition since children in rural areas today are fed on a porridge made from ragi.

The World Bank document for Karnataka claims that indirect benefits in the form of increased employment will be 39.43 million man-days, but does not add that by the time the shift from ragi to eucalyptus has taken place, the loss of labour (earlier used in ragi cultivation) over the same period will be 137.5 million man-days. After the initial planting of eucalyptus saplings, labour will not be needed for eight years till the trees are harvested.

For farmers, social forestry is even less of a headache than green revolution technology, where one has to contend with a market, and where access to fertilizers, seeds, mechanical and electrical power is chronically deficient, and labour problems lead to intense conflicts and violence. However, the ideology that pushed the green revolution is operative here in equal measure. To meet the firewood shortage, the immediate scientific or bureaucratic response is to increase the biomass stock as an automatic prescription for meeting the crisis. After the green revolution, multinationals outbid hungry peasants with better prices for grain and turned food stocks into cattle feed. It is the same with eucalyptus. Is eucalyptus wood a cheap fuel? The fact is it cannot even begin to rival the wood from traditional varieties like *honge*. But, more important, even if eucalyptus were available, industries would pay more for it (as they are already doing) than the fuel-hungry peasant.

The price of *honge*, for example, is Rs 250 a tonne, that of casuarina, Rs 200 a tonne. But eucalyptus commands a price of Rs 250 to Rs 300 per tonne, sometimes more, from industrial interests. Farmers who grow eucalyptus themselves do not use it for domestic fuel. What do they use for cash while the tree grows? As Bandyopadhyay *et al.* discovered, agents from industrial houses pay growers yearly instalments till the trees are harvested.[30] An all-win situation for the growers, a no-win game for poor ragi labour.

The spread of eucalyptus also means the decline of traditional fuel trees, since the capital stock of these is not augmented. *Honge* oil will soon be replaced by kerosene, for which a person needs cash, and the country, foreign exchange.

As for 'social' forestry or 'community participation', this will

flourish in a new form as the communion of interests between landowners and the captains of industry is solidified. In fact, the entire country-wide social forestry programme, rooted in new and growing markets for the produce, is already leading to the decay of traditional ties that once provided the social organization essential for producing traditional food crops.

Eucalyptus, as Bandyopadhyay *et al.* point out, has provided a way for farmers to make profits from the land without the corresponding dependence on the community.[31] This alienation from the community has led to insurmountable problems in generating genuine community participation in the utilization of common uncultivated and unforested lands for raising village wood-lots, the principal aim of social forestry. Without this the outlook for firewood will indeed be bleak.

The most astonishing aspect of the social forestry story is the successful manner in which 'developers' have been able to pass off a corrosive anti-social forestry plan as a genuine social good. Considering the large sums involved, it is difficult to see how these projects will be brought to a halt or radically modified. The fact is that the programme could produce beneficial and lasting results if a few simple principles, which include the banning of commercially useful trees on agricultural lands, were followed. A return to the traditional wisdoms regarding social forestry found in B. V. Krishnamurti's studies, would be a step in that direction. As we can see, money is available in generous quantities, but common sense and a concern for the quality of life of the rural poor, and the rural environment have disappeared, like our older more caring and benevolent trees.

As the social forestry fiasco illustrates, there is a serious conflict between the perceptions and interests of international institutions such as the World Bank, and the environmental interests of the South itself. We know, for instance, that the same raw material can have two different uses.

Take the example of wood. It constitutes a primary material for industrial growth. At the same time, it is also a resource directly used by people in our societies to meet survival needs. Because of its commitment to economic growth of a particular kind, the Bank is incapable of looking at wood except as a raw material for industry. Neither can it perceive the environment of the South for what it is: an enormous resource for the survival needs of the

population. It therefore utilizes environmentalism as a cover for converting the environment-as-resource for subsistence into an environment-as-base for industry.

It should be obvious that an environment policy which directly benefits the peoples of the South will be radically different from that formulated by the World Bank. While Indian environmental activists talk of regenerating and restoring the environment for *sustainable* use, the World Bank is mainly preoccupied with reconstructing the economic growth possibilities of the North's economies.

International financial agencies do not believe in environmental regeneration, except when it concerns their own countries. Then they tend to use the best science they have. If, however, we ourselves do not accord priority to the regeneration and expansion of our natural forests, we are in trouble.

We must remember the tropical monsoon rain concentrates all its energies in a three-to-four month period. If there is no mediation between downpour and soil, we know that soil is displaced. This kind of erosion is difficult to repair. For that reason, just as long-term considerations dictated the conservation of the Silent Valley forest, so equivalent long-term considerations must be a part of all reforestation programmes.

The Charade Continues

After the social forestry 'con-game' had run its destructive course, a new environmentally-oriented programme was propagated by the National Wastelands Development Board (NWDB). Under the Board, the so-called 'wastelands' of the country were to be made more 'productive'. Invariably, this meant industrial and energy plantations in which large companies could participate and profit at the expense of the plants, animals and human beings who have so far used wastelands as a common resource.

Predictably, the programme was drafted by the World Bank. The documents relating to the project were treated as confidential and withheld from public debate in India till the project reports had been accepted. One core component of the programme was a proposal to 'privatise the commons and wastelands', distribute them in the form of tree *pattas* to a few landless labourers in the village, and give the latter resources to put in trees or tree cover.

No thcught was given to the role of such 'wastelands' in the ecology of the subcontinent.[32]

The concept of the 'wasteland', as Vandana Shiva has pointed out, is of colonial origin, used by the colonial power to categorize large areas of the country, including lush forests, *from which the authorities could raise no revenue.*[33] However, as is now recognized, the label is a misnomer for a varied environment that is biologically active, and which includes forests, wasted lands, niches for many kinds of animals, and of course, fuel and other resources for the poorer folk. At any rate, the Board was bound to consider all these as 'wasteful' use of what it considered extensive land resources. It sought to evacuate these existing niches in the interest of 'development'.

Now examine the variance in objectives between 'development' and its opposite. True restoration of the 'wastelands' entails regenerating them with types of trees that simultaneously heal the land, restore the soil, and rebuild village environments.

Instead, we find a tree planting programme for an economic objective (loans from the World Bank have to be repaid) so that the species of tree used are fast growing (therefore eucalyptus) and can be mowed down as fast. This has nothing to do with either ecology or environmental conservation.

Inappropriate, destructive, destabilizing development. Development is an ideology, a project adopted by governments of the South, sponsored by international financial institutions such as the World Bank, the IMF, the World Food Programme, FAO, SIDA or DANIDA. There is a common link connecting and legitimizing their actions: their claims that their operations are based on 'modern science'. The transfer of development is welcomed by the ruling classes of the South because 'they' (i.e. the western world) have more 'modern science', 'we' have 'less'. And they are willing to 'share' it with us, for our own benefit. Modern science brings development. That is the promise. Instead, we have more violence.

3

Science and *Himsa*

In two earlier essays entitled 'Science, Colonialism and Violence',[1] and 'Science, Technology and the Future of Human Rights',[2] I have argued in detail the following principal propositions: one, that modern science and violence (*himsa*) are inextricably connected, and that the relationship has made possible a degree and intensity of violence hitherto unknown; two, that the extension of the reach of modern science can only lead to more extensive and intensive forms of violence; three, that development ideology is partly legitimated by modern science; and four, that development, legitimated by modern science, constitutes the most serious threat to human rights in our era. Here, I shall briefly summarize the issues.

Modern science and the technology based on it are fundamentally violent forms of handling the living world: violence is part of science's text, part of its design and implementation. The notion that unjust social structures are responsible for the abuses of science is only partly true, and often exaggerated. I define violence (*himsa*) as physical and mental harm to living organisms.

My first argument relates to the scientific method which excludes compassion. Its postulates allegedly require the excision of values. In actual operation, both the method and its metaphysic demand constant mutilation of the other. Vivisection, for instance, is an essential component of the strategy of achieving 'scientific truth'.

The scientific method, in other words, has always maintained its own category or directory of values. Just because these values remained undisclosed, it was assumed they did not exist. The scientific method advertises it is the best assurance of 'objectivity', as this is based on 'facts'. When we examine the nature of these 'facts', however, we discover a number of embarrassing epistemo-

logical shadows: the scientific 'fact' is not the ordinary event or object in itself, with all the relevant historical forces acting on it at that moment. It is a theory-laden fact, a fact created under the directions of a specific metaphysics.

The principal feature of the Experiment (which is a tool to create 'scientific facts') is that it is devoid of historicity, of uniqueness, of time. In order to experiment one has to locate one's facts within an area dictated by certain postulates. Postulates are assumptions unsupplied by any experiment. These postulates have never been subjected to democratic or even rational scrutiny. There is no reason given why one postulate is preferred to another, except the pragmatic one: that such and such a postulate is useful, convenient, or gives extra power.

A scientific fact in other words is an historical event stripped of its unique features. Its essential nature is abstracted, in order that the new information can fit other similarly anaesthetized historical events. The fact that an experiment distorts reality is no longer doubted. Strikingly, such distorted information or 'objective knowledge' is passed off as the only true picture of reality. The method thus arrogates to itself the right to function as the sole absolute criterion of truth. What science creates are 'artificial' facts. Violence results when the 'artificial' fact is imposed on 'natural' nature in its ascientific state.

Modern science is not a presupposition-less activity, though it may often pretend to be. It apparently starts from fact, and its postulates appear to militate against any metaphysics, including teleology. Yet, while its postulates are hostile to religion, in fact they function as a front for a metaphysics. All postulates, because they are assumed, distort reality and define it in selective ways. The metaphysics of scientific rationality for instance, requires that one approach reality within brackets which are themselves within brackets.

It has therefore been mistakenly believed that science destroyed metaphysics. In fact the scientist has merely replaced one set of metaphysics with another. There is a specific and recognizable metaphysics that enables scientists to detonate an atomic bomb over a human population purely as an experiment; or to vivisect animals for mere curiosity in the laboratory; or to endorse the planting of a monoculture forest under the garb of scientific forestry, thereby causing permanent harm to the environment.

If what I have stated concerning the question of science and violence is acceptable, then the second principal connection, that the extension of the reach of modern science leads to increased violence, needs no empirical confirmation, but is the logical conclusion of the earlier statement. I will therefore not dwell on this statement but state the third, which is of paramount importance for the theme of this study: how is development ideology legitimated by modern science?

Since the 1940s, development and modern science have been related to each other as a horse is to a carriage. Development was desired because what obtained prior to it did not function, we were told, with the slick efficiency of modern science. Modern science was desirable, because it made development possible. The two provided mutual reinforcement of each other. Science was responsible for the difference between tradition and the new status in human living that development promised and it in turn encouraged a specific development strategy.

The origins of this relationship between modern science and development date to the colonial period, when modern science entered the South in the company of imperialism and worked closely with imperial interests. A graphic illustration of this in the case of medical science has been provided by Radhika Ramasubhan in her study, *Public Health and Medical Research in India*.[3]

Now this should not surprise the reader. Some of the principal laws of modern science (MS) arose out of industrial experience. For instance, the Second Law of Thermodynamics resulted from efforts to improve the working of the steam engine with a view to advancing industry.

The Indian scientist, C. V. Seshadri, in a paper on *Development and Thermodynamics* has provided some original clues to the historical development of this relationship between industry and MS.[4] On close scrutiny, Seshadri found the Second Law *ethnocentric*. He charged that due to its industrial origins, the Second Law had consistently favoured the definition of energy in a way calculated to further the allocation of resources for big-industry purposes (as opposed to craft).

In a related paper, co-authored with V. Balaji, Seshadri wrote: 'The law of entropy backed by its authority, provides a criterion for utilization of energy available, from various resources. This criterion, known as the concept of efficiency, is a corollary to the law of

entropy and came into existence along with the law. The efficiency criterion stipulates that the loss of available energy in a conversion becomes smaller as the temperature at which the conversion is effected is higher above the ambient. Therefore, high temperatures are of high value and so are resources such as petroleum, coal, etc., which can help achieve such temperatures. In this sense, the law of entropy provides a guideline for extraction of resources and their utilization.'[5]

Seshadri then went on to show how the definitions used are tautological or circular. 'The notion of energy and its corollary concept of efficiency, play a crucial role in allocation of resources by deciding whether they can be useful for the kind of purpose for improvization of which these concepts have been created.'[6]

He concluded that 'the central concept of modern science is thus fused with one kind of resource-utilization.'[7] In other words, other kinds or patterns of resource utilization have a negative relationship with M S.

A production economy allegedly based on M S not only provides itself with a self-serving criterion with which to propagate and legitimize itself, it thereby also assumes it has a justification for taking over the processing of all resources hitherto outside its domain and untouched by M S. Just as economics had invented the idea of scarcity to further its domain, M S resumed the idea of thermodynamic efficiency to dislodge competition.

As Seshadri pointed out, both nature and non-western man proved to be losers when the thermodynamic definition of efficiency became the criterion for development. Both non-western man and nature by definition became overnight undeveloped or underdeveloped. A tropical monsoon, for example, transporting millions of tonnes of water across the subcontinent, became by definition 'inefficient' since it did its work at ambient (and not high) temperatures.

In fact, all processes or work effected at ambient temperatures are discounted in the suzerainty of M S. Thus tribals, bamboo workers, honeybees and silk worms process the resources of a forest at ambient temperatures, without the polluting side-effects of waste heat and effluent associated with big-industry processes. However, for development, it is only the rayon and pulp units that process (the same) forest resources but using high energy boilers that contribute to real economic growth and production. 'The

efficiency criterion stipulates that the loss of available energy in a conversion becomes smaller as the temperature at which the conversion is effected is higher above the ambient.' By this means, in fact, entire industries (and livelihoods) were destabilized and exorcised by M S.

This brings us to the final connection between modern science and development: that development based on modern science constitutes the main threat to human rights in our era. To many people living in traditional ways, the benefits of modern science were not immediately obvious, and neither did development seem to offer a better way of doing routine things. So, to enforce development the state, armed with legal support, stepped in. All over the South the modern state had decided to bring people and countries into the modern age. In actual terms, all that this meant was that people had to be remade as copies of their more 'successful' western counterparts. The people would be 'forced to be free', particularly when they were unable to recognize for themselves the 'benefits of development'.

Thus, the intimate connection between development and modern science was underwritten by the modern state. The state's commitment to development stemmed from its equal commitment to modern science. Modern science was an ideal choice since it re-makes reality by re-creating concepts and laws. It manufactures and produces new knowledge, and fresh interpretations of how things should work. A state which saw itself as a factory obsessed with 'production', found in science a congenial mate to play out its self-appointed role. The modern state does not understand the right to be undeveloped. It claims the right to develop people and nature on the basis of a vision of progress set out according to blueprints supplied by modern science. People have no role other than as participants in this great adventure. In exchange, they are privileged to consume the technological wonders that result from the heady union of development and modern science. In the eyes of the state, that is adequate compensation for a surrender of their rights.

The modern Indian state is a prime example of such trends. It has rigorously adhered to this mode of development in every area of human endeavour—whether it is in producing sugar in preference to *gur*, furthering agriculture based on chemicals rather than on organic inputs, expanding a capital-intensive white revolu-

tion, elaborating a nuclear energy programme, or the making of textiles on rotary machines instead of on handlooms.

In every instance, the state has attempted to eliminate apparent low-efficiency processes, modes of knowledge and techniques, in the village, cottage or informal sectors, in favour of machines based on modern science and technology. Development has meant nothing more and nothing less than the outright displacement of one set of ideas, people, realities, cultures and processes and their substitution with another set designed by MS.

In what follows I shall illustrate these themes through a discussion of how MS has affected four specific ingredients of ordinary daily life: *gur*, *idlis*, *rotis* and white sugar. In each instance, I shall demonstrate how the deadly combine of development, modern science and the state has only ended up in 'obnoxious' development.

Sugar, Science and Development

To begin with, I shall analyse the nature of that ubiquitous and primary element of 'civilized' life today: white sugar. I am interested in sugar because its ephemeral sweetness, coupled with the vast damage it generates, is akin in many ways to the ephemeral achievements of modern science which deeply conceal their own form of violence against man and nature. Modern science, in the form of white sugar, has become a major threat to public health. And I shall be able to demonstrate without much difficulty that the older Indian solution to the human weakness for sweetness is safer and saner.

The popular fondness for white sugar correlates poorly with the empirical evidence we have of the damage it can cause. Yet white sugar remains one of the great symbols of modern civilization, a fairly high-status commodity.

The privileges accorded to the production of sugar, as against its *desi* cousin *gur*, are justified on the ground that the former employs modern science in its establishments, and is therefore efficiently managed, while the latter, restricted to the domain of peasant knowledge, is a relic of the past.

Beneath the shimmering white of sugar's modernity, however, lies the disconcerting fact that use of this commodity is profoundly related to a dramatic decline in the consumer's physical and

psychological well-being. The normal thinking person should shrink from its use, and planners should reorient public policy with regard to its production. But this is not done. Why not?

One major authority on this subject, John Yudkin, wrote recently: 'I can make two key statements that no one can refute: First, there is no physiological requirement for sugar; all human nutritional needs can be met in full without having to take a single spoon of white or brown raw sugar, on its own or in any food or drink.

'Secondly, if only a small fraction of what is already known about sugar were to be revealed in relation to any other material used as a food additive, that material would promptly be banned."[8]

In an interesting study done for the United Nations University (*Food, Social Cosmology and Mental Health: The Case of Sugar*) Dag Poleszynski, a scholar at Oslo University, has brought together the evidence available regarding the impact of sugar on mental health. Talking about the influence of diet on people's mental illness, which Poleszynski says has become a major problem in the countries of the North, he focuses on sugar:

> We are particularly concerned with the effects of refined foods, epitomized by white table sugar, since such foods only have been part of human diets for a brief period in evolutionary terms. There is growing evidence that sugar affects our nervous system in several ways: the metabolism of sugar requires vitamin B and chromium in order to be metabolized, and literature also reports evidence that sugar upsets our calcium balance. We also know that an even level of blood sugar (glucose) is essential for our feeling of well-being and that we, by eating refined sugar, may upset this balance, resulting in various forms of mental disturbances.[9]

Normally, all the blood sugar or glucose required for the body's metabolism can be obtained from vegetables, fruits, fats or proteins. And together with the glucose ingested in such a wholesome form, come other nutrients required by the body. But this is not the case when we eat white sugar.

What actually happens when the human body plays host to an invasion of white sugar? Rudolf Ballantine writes: 'Nutritionally speaking, when one eats sugar he has incurred a "debt". Though he has met the need for carbohydrate, he owes himself a corresponding quantity of vitamins, minerals, fat, protein and fiber. The metabolism of sugar will proceed only through the use of all the accessory nutrients which are involved in its combustion. Vitamins,

minerals and even some protein and some fat molecules are all necessary.'[10]

Null and Null, two toxicologists, detail the body's response to the intake of white sugar in more exact language:

> Trying to restore an acid-alkaline balance to the blood, the metabolic system draws sodium, potassium, and magnesium from various parts of the body, and calcium from the bones.... Glutamic acid and other B vitamins are actually destroyed by the presence of sugar in the stomach.... Carbohydrates are incompletely metabolized leaving residues such as lactic acid. These poisons accumulate in the brain and throughout the nervous system where they deprive cells of oxygen. Eventually, the cells die, the result being that the body degenerates and becomes more susceptible to disease.[11]

Thus, two major developments occur when one eats white sugar in any form. First, since sugar requires vitamins, fats, proteins, and minerals for its metabolic activities, the stores of these vital elements diminish in the system. The sugar then begins to engage in brigandage: robbing the body tissues of these nutrients. Second, if sugar constitutes the major fraction of our total caloric intake, then 'we not only get the direct effect of robbing the organism of important nutrients, we also get an indirect effect in that it is replacing the intake of food which contains many other nutrients we need, besides those which sugar affects directly.'[12]

The infusion of sugar leads to marked variations in the blood sugar levels. One consequence is diabetes—a condition that has gone up 30 per cent in the industrialized countries, primarily due to large intakes of white sugar. But the variations in normal persons can be dramatic enough to produce 'fatigues, nervousness, depression, apprehension, craving for sweet, inability to handle alcohol, inability to concentrate, allergies, and low blood pressures.'[13] The appearance of such symptoms can be related to the impact on the nervous system of the withdrawal of important minerals like calcium, and vitamins of the B complex group.

To break down sugar the body demands calcium. Poleszynski reports that laboratory experiments with young rabbits fed only two to four grams of sugar per kilo of body weight per day (the equivalent of forty to sixty grams for a child weighing twenty to thirty kilos) showed, after 146 days,

> large pathological changes in the whole skeletal system in the form of bone softening, bending, cracks, and fractures. The bone substance became so

> weak that one could easily cut it with a knife. In addition, one observed a pathological growth in the parathyroid gland, something which clearly points back to the interruption of the calcium balance.[14]

These observations underscore the important role of calcium in the body. Its presence is presumed to have a protective effect against many forms of pollution, particularly from heavy metals like lead and cadmium.

Here then is sugar, a singularly modern invention, accepted by societies without question, granted pre-eminent status, a potential threat to political stability if its price gets too high, and yet, a principal contributor to what Dr C. V. Seshadri has called 'the public ill-fare'. The production process for this lethal product has been lavished by science and technology, despite knowledge that intensive use of it is as toxic as superstition or quackery. If this were all there was to the question, one would have dismissed the use of sugar as another harmful addiction, like smoking, difficult if not impossible to eliminate. But this is not so. For in this country at least, this toxic menace is designed to wipe out another form of sweetening whose contribution to positive well being was more precise, *gur*.

Why Gur *Is Better*

Our culture has known two forms of sweetening (in addition to honey): *khandsari* and *gur*. Both these traditional sugars contain vitamins, iron, calcium and phosphorous that refined white sugar does not have. Thus, though we have had for centuries the know-how to isolate sugar in the form of *gur*, we maintained an extraction rate that preserved the essential minerals and vitamins. In fact, *gur* is a 'food', something that cannot be said of white sugar.

Table 3.1 gives a clear, definitive picture of the comparative food values of white sugar and *gur*.

C. V. Seshadri has pointed out that the situation is even more tragic because deficiency in iron and vitamins particularly in the form of prenatal and neonatal anaemia, is a serious problem in our society.[15] *Gur* is a good source of iron and vitamins, but we are discouraging its production to popularize sugar, which contains nothing to compensate for the precious loss. Capping this irony, Seshadri points out, is the fact that the government is now involved

in massive welfare programmes to augment the supply of iron and vitamins, from synthetic sources, for women and young children. This of course is a highly respected strategy of modern economies: development via drug multinationals!

TABLE 3.1

NUTRITIVE VALUES OF WHITE SUGAR AND *Gur*

	Gur (Unit 100 gms.)	*White Sugar*
Proteins (gm)	0.4	0
Minerals (gm)	0.6	0
Carbohydrates (gm)	95	99
Ca (mg)	80	0
p (mg)	40	0
Fe (mg)	11.4	Trace
Carotene (ug)	168	0
Thiamine (mg)	0.02	0
Riboflavin (mg)	0.04	0
Niacin (mg)	0.5	0

SOURCE: C. V. Seshadri, *The Sugar–Food–Alcohol Nexus*, MCRC.

One would think then, that in keeping with the chapter of fundamental duties added to India's Constitution in 1976, which enjoins it on all, including the Government, to promote the scientific temper, efforts would have been made at the official level to control the production and consumption of white sugar, to increase the mass production of *gur*, and to orient our science and technology capacity to tackling some of the significant technical problems *gur* faces. On the contrary, no product has faced such hostility from official and business sources than *gur*. The attacks become all the more astounding when one discovers that the production of white sugar has been given *special* protection by law since 1932, since it could not compete with *gur*! Even today, farmers in the vicinity of a sugar factory are prohibited through various means from processing their cane into *khandsari* or *gur*. (The Supreme Court in 1987 upheld an order of the Sugar

Commissioner that farmers must surrender all their cane in the vicinity of a sugar mill to the factory). Such is the liberalism of liberal economics.

Despite this, fidelity to the consumption of *gur* remains extensive. There is cause for concern, however: the percentage of *gur* consumption in relation to total sugar consumption is coming down: from 56 per cent in 1977 to less than 40 per cent today.

'The imperatives of modern technology,' writes Seshadri, 'may often lead us to emphasize the wrong values.'[16] Technology drives people instead of it being the other way around. The imperatives of the modern sugar industry have compelled it to move in the direction of huge crushers and evaporators. To keep these functioning at capacity more land is brought under sugar cane, which is one of the few crops that is guaranteed, under present tillage practices, to leave the land devestated after a few years of use. Modern technology in sugar is presumed to be attractive on the usual counts: economies of scale, higher recovery from cane, and less energy use compared with the large thermal losses from thousands of smaller units making *gur*. Governments prefer white sugar for it can be transported over long distances and stored, hoarded and otherwise misused. A few extra kilos released in the market on the occasion of the Divali festival or Id win the authorities a few extra points at the opinion polls.

There is no conceivable reason why, in a labour surplus economy, with widely-dispersed skills for *gur* manufacture, we still opt for labour-displacing processes. One of the principal objectives of development is employment; one of the principal means to well-being today is a source of income from one's labour, productively utilized.

While there are a few technical problems associated with *gur* manufacture these are related, as Seshadri notes, to the use of inefficient furnaces which reduce fuel efficiency, and to enzyme and bacterial action which shorten the shelf-life of *gur*. But we are a nation attempting to put rockets into space, managing nuclear reactors, equipped with sophisticated technology institutes and labs, and it is difficult to believe we cannot design better furnaces, and work out methods for improving the shelf life of *gur*. ASTRA, Bangalore, has worked on a thermally more efficient furnace for *gur* manufacture. If the relevant research has no political godfather, there must be reasons for it, the principal

being, I suggest, the production of liquor. Sugar molasses and alcohol-producing units are another horse-and-carriage unit. The intimate connection breeds vast quantities of revenue for the state.

Tradition and Modernity: Rotis *and Bread*

Our country's city dwellers now have access to machine-made white bread. The manufacture of white bread from refined flour or *maida* parallels the manufacture of white sugar in more ways than one. In white sugar, vitamins or minerals have been eradicated by the production process. To produce white flour, a similar kind of debilitating extraction takes place. The final product, white bread, is pleasant to taste, but causes havoc with the teeth, and with the other end of the human processing system, the colon. But here too, as with *gur*, although our society has a sound alternative, we are gradually being forced to abandon it since 'technology can often compel us to emphasize the wrong values.'

Whole wheat contains besides the usual carbohydrates, B-complex vitamins and minerals. The vitamins are concentrated in the *outer* layers of the kernel. Refining retains mainly the carbohydrates, and eliminates most of the B-complex. Both zinc and cadmium are found in wheat grain: the zinc in the outer layer, the cadmium in the grain centre. Milling removes the zinc, but retains the cadmium: the beneficial is eradicated, the malignant is maintained.

The final product lasts longer since even the oils are lost, but it is without fibre. This is an unwanted development since fibreless paste sticks in the crevices of the teeth and causes caries. It also leads to constipation. But like white sugar, and like satellites, VCRs and airports, white bread is another major symbol of modern civilization.

Having discovered that the technology that produces white bread also ruins it nutritionally, millers in western countries now add synthetic vitamins and minerals to the flour they use to make bread. So we have 'vitamin-enriched' bread! Technology first eliminates the vitamins and minerals from the flour, and then shores it up through synthetic inputs. Poleszynski's United Nations University study concludes that the best way to relate to wheat and flour is the *Indian* way. He writes: 'A clear goal with respect to flour, therefore, would be to gradually raise the extraction rate to

at least 90 per cent for all flour used in lighter breads, which, incidentally, is exactly what has been done in India for several thousand years. Since a less-refined flour stores less well than flour of lower extraction rates, this also would be an argument for establishing a more decentralized milling system for grains, thus strengthening local self-reliance in food.'[17]

Rudolf Ballantine adds: 'The Indians continue, as they have done for thousands of years, to quietly grind their flour with stone mills and sift out the coarsest 5 per cent producing a bread both wholesome and digestible. It seems likely that this process *approaches the ideal*, and there is no reason why modern steel roller mills could not be adapted to produce a similar product.'[18]

The periodic visits made by our *roti*-eaters to the flour mill are necessitated by the fact that the germ of the wheat contains oils, and consequently, whole wheat flour, from which such oils have not been removed, tends to go rancid. Since whole grains do not spoil for years, it makes sense to mill only small amounts at a time. The solution on the whole is modest, ingenious. But it is unglamorous. What is modern must be welcomed, otherwise people will say we are living in the eighteenth century and not in the twenty-first! Besides, we have so many dental colleges, and their products suffer from an unemployment problem. The proliferation of caries among the population could keep all dentists gainfully employed, and add to economic growth.

The periodic milling of wheat by Indian households is a prime example of an older technology that cannot be updated or improved by modern science. It is in fact a form of permanent or optimum science, quite distinct from modern science which is constantly unhappy with itself, continuously engaged in modifying its technologies till we have reached a point where such modification has become an end in itself. Once modification itself becomes a source of profit, it seems a natural process, something the human species has always been doing since it felt the need for technology.

Fortunately, a large number of people intend to preserve the older system of milling their wheat to prepare their *rotis*. They may not know that their habits have recently been vindicated in world forums such as the UNU. But this does not matter. More important is the planner's prejudice, which, as in the case of sugar, has blindly convinced him that large-scale sugar factories and flour

mills are the answer to modern India's needs. Such opinions are getting increasingly difficult to maintain in the light of more knowledge. But the bondage to modernity is of a peculiar kind. Often, its alleged superiority or advantage is thrust upon us only to conceal the fact that some bureaucrat has made a commission on some sale of technology (which this country may not at all need).

One of the facile assumptions we make about the countries of the North is that there must be a positive correlation between their state of being industrially advanced and their use of food science. In fact, the more industrially advanced an economy is, the more likely that it depends on processed foods, and the more junk its population is encouraged to eat in the name of progress. There is actually a genuine poverty among the people concerning the kinds of food they need, or the ways they should prepare it.

Rudolf Ballantine has described the 'modern American diet' with its 'appeal on meat, salt, sugar and artificial additives' as 'low on vitamins, minerals, essential amino acids, essential fatty acids and bulk', but excessive on 'total calories... empty calories... total fat, saturated fat, cholesterol, refined sugar and salt.'[19] In what sense can one call such a society 'developed'?

The most valued item for this kind of society, a symbol of its consumption habits, is that absurd mixture of water, flavouring and sugar: the Pepsi and the Cola. Our teenagers, for instance, now happily pay Rs 15 for a litre of this coloured, worthless fluid, even while their parents weep at having to pay Rs 6 for a litre of milk. Sometimes I feel that I must be wrong: that this must after all be progress! But how can one pass off advanced cretinism as advanced food science?

The preparation of food requires a high level of knowledge. India and China are, in that sense, fairly advanced culinary civilizations, having perfected the art of food preparation and appropriate diets to an elaborate degree. They have also evolved technologies appropriate for such diets. *In that sense, we are fully developed nations.* We may not have satellites, but in the most important of everyday matters, the eating of food, we retain admirable technologies and processes, and not even the most sophisticated food science can dispute that.

Therefore, the invasion that now threatens us in the form of junk foods, symbolized by white bread (and Colas) is unwelcome. The West once destroyed our industry, and now it threatens to 'de-

develop' our sense of taste and our sense of what constitutes good food. Is there anything in our food repertoire that will remain 'sacrosanct'? There is. A plain-looking cake of steamed rice, called the *idli*.

Idli *and Biotechnology*

C. V. Seshadri says the following about the *idli*: 'I don't think the Government of India even realizes that South Asia is one of the greatest repositories of fermented food technologies in the world. Nearly in every thing. I mean whether you talk of the *idli* or the dosa. No other set of countries has that information.

'In fact, a famous American professor named Steinkraus from Cornell University is considered the world's *idli* authority! There's the irony for you. He knows the bug. He has scientifically done it. He says, "There's no question, I'm going to try soya-cornmeal mixtures. Soya to replace *urad* and cornmeal to replace rice, and we can see the *idli* as a very good food for the Americans." They are going to package and sell *idli* food in America. I mean this is knowledge that came from this country.'[20]

Microbiology, says Dr Seshadri, is fortunately one discovery that predated Newtonian science—'herein lies people's salvation'. South India's indigenous fermented foods are applied microbiology on a large scale, but decentralized at the household level. Significantly, the *idli* is such a strong part of South Indian culture that it is impossible to dislodge. I wish some of our other culture specific ideas and traditions had its strength.

The Borlaugs of this planet, with help from their Indian friends, have attempted to sabotage this most perfect of human foods by drowning this country in Mexican wheat. White bread is part of the Government's idea of a nutrition revolution. One cannot otherwise explain the mania for more large-scale bread-making factories. There is little about the *idli* that can be 'improved' by modern science: it is optimal science, period. Almost every one in the South knows how to make it, and all economic classes enjoy it: it is not merely a poor man's food. One survey showed that in one street of Madras alone, 10,000 *idlis* are sold per linear kilometre per day.[21] If one does the necessary multiplication, one would arrive at an astronomical quantity for the city as a whole. Think of the number of *idlis* produced daily in Tamilnadu or, better, South

India as a whole. (The study quoted included only commercial *idli* sales).

Dr Seshadri's comparison between white bread and the *idli* (Table 3.2), shows that the latter is clearly better in terms of nutritive value.

TABLE 3.2

A Comparison of Packaged Bread and *Idli*

	Protein *gm/ka*	Minerals *gm/kg*	B-carotene *ug/kg*	Fe *mg/kg*	Thiamine *mg/kg*
Idli (1 kg batter) = 42 *idlis*	83.3	3.05	5.5	13.3	0.07
Bread (1 kg dough) = 45 slices	67.6	0.35	14.7	15.29	0.07

Source: C. V. Seshadri, *Microbiology of Food*, 1985.

Table 3.2 does not exhaust the *idli*'s virtues. White bread, for example, has no fibre, *idli* does. Vitamins and minerals added, as noted earlier, to white bread to enhance its nutritive qualities are in the *idli*, synthesized naturally by bacteria. The *idli* is a fermented food; the species of microbes that aid in fermenting the *urad*-rice mix include the friendly ones: Leuconostoc, Lactobacillus and Klebsiella. There are trillions of them in every house in Madras, improving human nutrition cheaply. Human beings would be a clear minority in such a congregation.

Since modern science has determined that microbiology be one of the new frontiers for profits via biotechnology, we can expect that some microbes will be economically valuable. Scientists will tinker with their codes, patent them, and market them via corporations. The kind of fermentation used for *idlis* is given a fancy name: non-sterile, single protein, fermentation. The consoling part is that not much can be done to patent curd-making bacteria or

idlis since nature entitles them to make their appearance once certain conditions are right.

Western-trained, western-oriented scientists in India, however, still remain ignorant of this 'vast storehouse of fermentation technology' that South India constitutes. Their excitement about biotechnology is focused on what is happening in the laboratories of western countries. Yet it is clear that we are so well versed in the general principles of this technology (a household talent), that we have little to learn from centres abroad. Our experience in applied microbiology should enable us to work out a different use pattern for biotechnology research and work that does not follow the path that this science is taking in the West: close collaboration between venture capital, greedy scientists and of course, multinational corporations.

I am not suggesting that Indian science meddle in the organization of *idli* making in South India. My proposition is that we use the experience we have as a base for moving into the entire field of fermentation technology. Indian science as presently constituted could do little to the science of *idli*-making itself without actually ruining it altogether.

In fact, there are numerous instances of scientists having entered a simple technology field to improve on it, causing more problems than they have solved. I am reminded of the ASTRA *chula*, and the developments concerning its extension in Karnataka. The *chula* as developed by the Indian Institute of Science is a marvel of simple engineering and design, and is probably the best available from the point of view of thermal efficiency. It cooks faster than traditional *chulas* and uses half the fuel.

It is its construction that is the problem. *Chula*-making has traditionally been confined to the women's domain, but the fabrication of the ASTRA *chula* has become an exclusively male preserve. An attempt to improve the lives of rural women has inadvertently taken one more skill out of their hands, and passed it on to the males.[22]

The *chula* has traditionally been viewed as inefficient in its use of energy; in the current drive to conserve fuel, it has attracted the attention of scientists. The making of *idlis*, thank god, is another matter. The product has no inadequacy worth a scientific assault. That will be its saving grace.

Thus *gur* has survived, despite oppression; the *roti* and the *idli*

have both thrived. The conflicts between tradition and modernity, *gur* versus white sugar, *idli* and *roti* versus white bread, have been described above in terms of conflicts between two different civilizational sciences and techniques.

Another set of conflicts—the battles between what I call the 'natural' and the 'scientific'—need to be examined. Both tradition and nature today find modern science an oppressive force. We have assessed modern science from the standpoint of tradition; we shall now proceed to look at it from the perspective of the 'natural'.

The 'Scientific' Against the 'Natural'

The Case of Breastfeeding versus the Bottle

In the past century the scientific in league with the progressive and the modern has been in the ascendant, while the natural, linked with the primitive and the backward, has been abused at every stage. From this, it has been but a small and logical step to replacing the natural with the scientific. No clearer instance of this is available than the attempt to substitute the natural process of breast-feeding infants with bottle-feeds.

The drive to replace the practice of breast-feeding illustrates the hazards of interventionist science and its ambiguous contribution to human welfare. The development of infant formulas is closely linked with science and both are interwoven with making profits from the exploitation of defenceless infants. The industrialization of infant nutrition, a major enterprise in redundancy, rests on the promise of science to invent a substitute for what is after all freely available, decentralized, and unique: breast milk.

The promise is part of the overriding ambition of modern science to make inroads into practically every sphere of the natural domain, to leave nothing autonomous, to impose its own will and design, and to replace natural processes that cannot be economically colonized, with substandard substitutes that can generate profits.

The invention of infant formula was not rooted in any fundamental dissatisfaction with the original product. Yet, in the fifties and sixties it seemed to most educated people that the bottle feeding of infants (like white sugar and white bread) was a sign of being part of the modern world. Western medical practice,

production trends and changes in social organization favoured the switch from breast to bottle. Corresponding developments in technology and environmental hygiene enabled bottle-fed babies to survive (the earlier history of attempts to bottle-feed infants seems to have been disastrous to child survival).[23] While medical science claimed that infant formula was as good as breast milk in feeding infants, development set out to advertise tinned formula as safer than breast milk. Going a step further, corporations began marketing the formula as better than breast milk. The infant food multinationals had simply located a new market for profits.

The approach to feeding babies artificially is symptomatic of reductionist science. The physical act of breast-feeding an infant is only one element of a complex but integrated series of events. The child not only gets perfect nutrition but the act of breast-feeding itself is responsible for the emotional bonding between mother and infant, important for the child's psychological and physiological development. The mother's body acts as an antibody-producing unit against hostile organisms that visit her child. Finally, suckling also delays ovulation in the mother, enabling her to rest between pregnancies and thus plays its crucial role in population dynamics.

Bottled milk-substitutes being one-dimensional, exorcise or ignore the other important factors that breast-feeding involves. The mother herself is made dispensable. Even more ridiculous, the role of educating the mother and advising her on bottle-feeding practices often passes over to the male.

Eventually, as research once again determined that breast milk and breast-feeding were superior and better for the infant, western women began a return to the older practice. The profit seekers were now compelled to take their equipment and advertising elsewhere. In countries such as India, modernization in conjunction with science rapidly made inroads into the well-entrenched practice of breast-feeding. The South which had, for the past four decades, associated all development coming from the West as the best and the most progressive, decided to bottle-feed infants with dedication. Thus, while in the West, breast-feeding is now considered by women and pediatricians the most 'scientific' manner of feeding infants, in India it is baby food and infant formula that are seen as modern and superior.

For the bureaucrats, scientists and medical personnel of the South the development of the baby food industry was seen as

making a solid contribution to economic growth and towards saving foreign exchange. Since breast-feeding was unsuited for economic valuation, it was dismissed as valueless. In a study on nutrition published by the Brookings Institute in 1973, a researcher reported that whereas in 1953 more than 95 per cent of Chilean mothers had breast fed their children beyond the first year, by 1969, only 6 per cent did.[24] In other words, an invaluable free resource had been squandered: 32,000 milch cows were now required to make up the loss. The activity of these cows contributed to 'economic growth'. The manufacture of tin cans for packaging infant formula is itself a major contributor to growth figures if one considers that a bottle-fed infant requires approximately 150 cans in a period of six months. (In the US in 1974, infant formula resulted in 450 million non-recyclable cans and a corresponding waste of 70,000 tonnes of tin plate each year). The manufacture of tin cans for packaging infant formula also became a major contributor to growth figures.[25]

One would imagine that since most Indian mothers breast-feed anyway (and in that sense, again, India is a highly-developed society), our scientists would not any longer concern themselves with baby food research. However, many nutrition and dairy scientists are still involved in such research. It is almost as if no Indian women breast-feed at all. The Central Food Technological Research Institute (CFTRI) in Mysore is credited with producing the first indigenous baby-food formula, which it gave later to Amul. The CFTRI naturally took credit for helping to produce locally a commodity formerly being imported. The research, however, reflected the priorities of that time, when breast-feeding was at a discount in Europe itself. Today this is no longer the case—pediatricians agree universally that breast-feeding can have no substitutes—yet research at CFTRI into breastmilk substitutes continues.

On 11 April 1984 the *Hindustan Times* quoted a UNI dispatch from CFTRI that the Institute 'has developed a milk food formula similar to that of breast milk.' When Dr G. P. Mathur of Gorakhpur Medical College wrote to CFTRI for clarification, a CFTRI scientist, Sarojini Dastur, wrote back to him discounting the story, as newspapermen use 'popular language which emphasizes news value, often at the expense of scientific facts.' A few months later, the National Dairy Research Institute (NDRI) put

out a press note in the *Economic Times* on 19 September 1984, which also claimed to have produced a new formula that was similar to breast milk. Again, as soon as the NDRI was questioned, the response was that a newspaper correspondent had 'misinterpreted his version in the newspaper.'

Scientific research of this kind by itself would have had little social impact. The tragic aspect of such research however, done at great public expense, is that it is then handed over to baby-food advertisers and manufacturers (like Amul and other Indian dairy co-operatives), who in the company of multinationals like Glaxo and Nestlé, continue to manipulate mothers into switching from the breast to the bottle. The damage to infant nutrition then becomes enormous, even criminal.

The excuse given by our major scientific institutions for undertaking such research is that a small number of children have mothers that cannot naturally breast-feed (2 per cent according to UNICEF). This soon becomes the basis for a weapon to deprive millions of others, through 'development', of the first-rate nutrition their mothers are naturally capable of giving them.

The tragic consequences do not end there: the decline of breast-feeding has become an indirect stimulant to population growth. This fact is now readily, even if despairingly, acknowledged. 'It is estimated', writes Dr F. W. Rosa, 'that breast-feeding prolongs the birth interval by about four months on the average in urban areas and about eight months in the rural areas.... In developing countries approximately more protection is provided by lactation amenorrhea than by family planning programmes or contraceptive methods.... The main factor leading to an increase in birth rates from 40 to 64 per cent among Canadian Eskimos was reported to be the introduction of bottle feeding. The increase in birth rate could even be correlated with the proximity to the nearest trading centre providing canned milk.'[26]

The population 'problem' itself provides in turn a fresh area for scientific research: the search for new contraceptives to stem the birth rate. The impact of science in one area produces problems for new scientific inquiry in another. Most of this research into the control of reproduction, conceived by men, is directed against women. The latest injectable contraceptive being introduced, Depo-Provera, does unacceptable violence to women.[27] Rather than invest in population-control programmes, it would be better

for governments to pay working women's employers for extended maternity leave, so that they could breast-feed their infants. But that would mean less work for scientists.

I am reminded of Masanobu Fukuoka's classic statement deriding, with pity, the circular 'progress' of modern scientific knowledge: 'Human beings with their tampering do something wrong, leave the damage unrepaired, and when the adverse results accumulate, work with all their might to correct them. When the corrective actions appear to be successful, they come to view these measures as splendid accomplishments.... The scientist pores over books night and day, straining his eyes and becoming near-sighted and if you wonder what on earth he had been working on all that time, it is to become the inventor of eye glasses to correct nearsightedness.'[28]

The ironic part of the baby food story is that the return to breast-feeding is now advertised as being 'scientific', a classic *volte-face*. The same science that had once dismissed breast-feeding as primitive and striven to invent substitutes, having retreated from the effort, now attempts by sleight-of-hand to redeem itself. Science has nothing to do with the invention of breast-feeding or with its continuance as a practice, but in our world the natural, to be legitimated, must be approved by the 'scientific'.

The pervasive influence of modern science in our lives often spills over into areas, such as breast-feeding, where it can only exhibit considerable incompetence and cause incalculable havoc. The character of science compels it to colonize areas previously outside its domain of control. In this regard, it resembles the great proselytizing religions which attempt to compel people to their point of view because of their unshakable belief that they alone possess the ultimate truth concerning God and nature.

We can expect then that science will eventually demand the replacement of all earlier processes of production and growth with ones based on its own fragmented intelligence. Other methods of growing rice, natural processes like breast-feeding infants, the immunological systems inherited by all human beings to resist and limit disease, are considered inferior to modern science's strategies. Another graphic example of this mentality is available in the encounter of tropical forests with 'modern science'.

Modern Science and Forests: The Raising of Substandard Substitutes

In many ways, the 'scientific' management of forests has striking parallels with the 'scientific' management of infant feeding. A natural process is first discounted or abused and then sought to be substituted with new processes invented by scientific intelligence. Within a few years, obvious gross and large-scale damage forces the innovators to recognize and acknowledge that something has gone wrong owing to the scientific initiatives themselves. The final reaction is to sponsor the withdrawal of all programmes involving human interference from the area of concern, and leave nature once again pretty much to itself. We have illustrated this almost classic cycle of events in the efforts to displace the practice of breast-feeding infants. We shall examine now how chillingly similar the experience of the tropical forest system has been with modern science.

Without their forests, the tropics are incapacitated as a functioning ecosystem. Conceive even now of the Indian subcontinent, for instance, as a vast storehouse of energy: the thick blanket of sensitive forest green efficiently converts massive amounts of solar energy through photosynthesis into biomass without an iota of pollution. Once the green skin is yanked off, the exposed underlying bodily processes begin to deteriorate.

The crucial importance of forests to survival was recognized early in Indian society. In fact, Indian culture is replete with the celebration of an *aranya* culture, based on reverence for trees.[29]

This is not to say that trees could not be cut and utilized to meet human needs. However, this was done without undermining the forest system as a whole. If one considers the original patterns of swidden or slash-and-burn agriculture, one notes that tribal communities raised food supplies through a sophisticated interplay of forest and crop systems. In the plains, in non-tribal areas, an equally harmonious relationship seems to have prevailed between village communities and adjoining forests.

Modern science and colonial demands changed all that overnight. The health and well-being of the tropics were now subjected to the demands of 'production forestry', fuelled by the intimate links between science and big industry, or rather, between colonial science and British imperialism. Large forest areas were removed

from the control of villages, and reserved for the purposes of industry and revenue.[30] Villagers lost interest in their maintenance and alienation commenced.[31]

Strangely, post-independent India's policies turned out to be no better. In 1976, the National Commission on Agriculture (NCA), echoing experts of the Fifth Five Year Plan, crystallized in its report what had already become 'received wisdom' in the country's forest departments: it recommended 'a dynamic programme of production forestry, aiming at clear felling and creating large-scale man-made forests with the help of institutional financing.'[32] It suggested that 'slow-growing' forests be gradually replaced with faster growing trees. Nature's way of producing 'biomass', according to the NCA, was too slow for economic development—the Commission obviously saw nature as a doddering old person, in need of superior techniques created by scientific intelligence. It showed itself to be ignorant of a fundamental issue: whether the sole function of forests was the production of biomass for industry.

It is important to pause a while here and consider what was actually taking place. The scientific imagination was attempting once again to invent its own version of nature. Obviously, the new definitions would have an impact not only on how we saw forests in future, but on the physical condition of existing forests themselves.

A forest ecosystem is a community of infinitely diverse living organisms that has evolved untouched by the human species, complete with a self-sustaining soil, and a full complement of so-called useless species (useless, that is, to man). In a fundamental way, all forests have a component that is useless to man, but vital for other organisms. This component is linked with other ecological tasks, some of which will always be unknown to us. In fact, some of the interrelationships between species are still in evolution. A natural forest grows and is constituted over time, sometimes over centuries. As a totality, a forest system has a right to its own ecological niche in the earth system.

Modern science cannot reconstitute a natural forest. It may or may not recognize this. But in any event it finds a virgin forest too anarchic (the original term for virgin forests is 'jungle') and prefers a more organized reality. So modern science adopts the next possible option available to it: it redefines 'forest' to suit its capability and its objectives. Since these objectives are closely linked with high-energy industry, the new 'forest' inevitably takes

the appearance and form of a plantation which we know of course is eminently suited to industry's needs.

Besides the term 'forest', the term 'soil' is also redefined: it is seen as no more than agar in a petri dish—a medium for growth—and as a holding station for chemical inputs, never in relation to the lifeblood of the planet. Next, the tree itself is seen as an instrument to convert inputs into mass, not as a binder of soil, a water retainer and a producer of mulch, and as a significant element in the complex chain of life. Neither is it considered as a producer of oxygen or a host to other living organisms.

Afforestation with modern science becomes in effect the deforestation of nature. This method of deforestation is more subtle and complete than clear felling, which is nowadays considered crude. A community of living organisms, related to the lifeblood of the earth, is replaced by an array of clones suited to the mechanical processes of industry. Nature is thus distorted beyond recognition. What the forest departments actually accomplish in their scientific afforestation drives is precisely the reverse of what they claim they want to achieve. They begin by pauperizing nature by definition. As these definitions begin to form the basis of official policy, they actually help create degraded environments.

The programme of production forestry and replacement of slow-growing species with plantations took nearly four to five decades before its horrors were disclosed and then overtly acknowledged. The terrifying damage caused thereby to India's environment may possibly never be reversed. The story is told bluntly and well by Madhav Gadgil and his colleagues.[33]

By the end of the seventies, officialdom realized the true extent and scale of the disaster. Irreplaceable virgin forests, the result of centuries of natural processes of growth, decay and growth, had been wastefully and indiscriminately felled for industrial and other uses, including fuelwood. This had drastically affected the environment, eroded and damaged soils, and brought about changes in rainfall patterns leading to drought and desertification. The loss of virgin forests also entailed the extinction of hundreds of wild genes of potential use to man.

In 1980, Government of India passed the Forest Conservation Act which would no longer allow the diversion of virgin forests for non-forestry purposes including plantations without prior approval of the Centre. The entry of scientific forestry man-

agement into the country's reserved and protected forests was finally banned.

Scientists now came to hold that the best way of allowing forests to thrive was to protect them from human interference of any kind. A good example of such natural regeneration is the Bandipur Wild Life Sanctuary in Karnataka, which has been strictly preserved from human intervention for the past ten years. Not even a stick of dead wood is permitted to be removed from the area. Remarkably, the forest has regenerated itself, and previously dry springs have almost miraculously recharged themselves. The Silent Valley ecosystem is the only known case in which a committee of specialists after much prevarication recommended that a natural forest needed to be protected in its own right.[34]

However, while there is now official recognition that existing forests need to be protected from the art of scientific forestry management, no answer is yet available concerning another equally serious problem: the continuing and unrelenting demands for the submergence of forests in the reservoirs of large dams or their elimination to make way for nuclear reactors or mining or other industrial projects.

To save the day, modern foresters have now come up with the notion of 'compensatory afforestation'. The main idea is to persuade planners and politicians that a forest submerged can be compensated by a new forest emerging elsewhere. However, whatever forest departments may promise, forests as stated earlier, cannot be recreated. Compensatory afforestation is neither compensatory nor afforestation. It is simply the raising of substandard substitutes, a false promise sooner exposed for what it is than later.

Tinned baby food, monospecies 'forests', white sugar, alcohol, white bread, are all symbols of that great modern co-operative: science, technology, development. We have seen how they are also sources of obvious violence.

4

Development as Propaganda; as Ideology

Development is ideology. It is heir to an unbroken line of influential ideas, all of which seemed 'obvious' in their time. An immediate precursor of the development concept was the notion of a 'civilizing mission' that numerous westerners believed they had inherited in the heyday of colonialism. Therefore, the idea of development is not unique to the modern era; instances of analogous thinking can be found much earlier. A striking illustration is available in the history of Britain's relations with Ireland.

Periodic insurgency against the British presence there occasioned a book by Sir John Davis, British Attorney for Ireland, entitled, *A Discovery of the True Causes why Ireland was never Subdued and Brought under Obedience of the Crown of England until the Beginning of His Majesty's Happy Reign.* Sir John describes what he believes to be the perfect conquest and what it involves:

> For that I call a Perfect Conquest of a country which doth reduce all the people thereof to the conditions of subjects: and the ordinary laws and magistrates of the Sovereigns. For though the Prince doth bear the title of Sovereign lord of an entire country (as our kings did of all Ireland) yet if there be 2/3 parts of that country wherein he send an army to do it, if the jurisdiction of his ordinary courts of justice doth not extend into those parts to protect the people from wrong and oppression; if he have no certain revenue, no escheats or forfeitures out of the same, I cannot justly say that such a country is wholly conquered.
>
> The defects which hindered the perfection of the conquest of Ireland were of two kinds and consisted: first, in the faint prosecution of the war and next in the looseness of the civil government. For the husbandman must first break the land before it be made capable of good seed; and when it is thoroughly broken and manured if he do not forthwith cast good seed into it, it will grow wild again and bear nothing but weeds. So a barbarous country must first be broken by a war before it will be capable of good government; and when it is fully subdued and conquered, if it be not well

planted and governed after the conquest it will soon return to the former barbarism.[1]

How graphic the imagery, and how familiar! Development literature is replete with such notions: uproot the character of non-western societies, transform them via the allegedly superior institutions of the modern West! For a more sustained elaboration of such earlier historical analogues of development ideology, one can refer to a number of studies: Ronald Takaki's *Iron Cages*, Leon Stavrianos's *Global Rift*, Ashis Nandy's *Intimate Enemy*, and of course, my *Homo Faber*. In his book, Nandy speaks of two forms of colonization.

The carriers of the first 'were people who, unlike the rapacious first generation of bandit-kings who conquered the colonies, sought to be helpful. They were well-meaning, hardworking, middle-class missionaries, liberals, modernists, and believers in science, equality and progress.'[2] Nandy then refers to a second form of colonization, 'the one which at least six generations of the Third World have learnt to view as a prerequisite for their liberation—the colonizing of minds, based on the generalization of the concept of the modern West from a geographical and temporal entity to a psychological category.'[3] For three decades, development was seen as westernization. The West became ideology, the only model. There was no clash of models because there were no other models.

Images have proved to be powerful instruments of domination in today's world: they are as powerful as bureaucrats and politicians in ruling our lives. Citizens of the North have, for example, a peculiar image of the South as a place of continuous disasters, poverty and general incompetence. This by itself is not really objectionable for it merely denotes the prevalence of widespread ignorance more than it does malice; what is problematic are the consequences, for the prevailing image sets the ground for intervention and imposition. Since the industrialized countries feel that their way of life is superior, they arrogate the right to impose it on other societies. The allegedly superior lifestyle or economy expands its niche in the planet, and insists, as noted earlier, that its technologies, based on superior science, should have primacy to process 'scarce' resources because they are the most 'efficient'.

Throughout their history the Chinese divided the world into two spheres: one inhabited by barbarians and the other by civilized

folk. The Son of Heaven, his court, Chinese society, constituted civilized society, the true measure of significance; people, ideas, technical inventions and commodities from outside the realm were of little consequence or import. In India too, up to about 1800, the society retained a similar notion of self-containment and sufficiency and though there might have been migration abroad, by and large, the collective mind did not feel the need to replace its ideas and values with alien ones.[4]

Colonialism changed all that: civilized folk became barbarians in the new world view, and those who came to plunder pretended to a civilizing mission. In India, China and elsewhere, the self-sufficient was now seen as stagnant, whereas the inadequate became the dynamic, inaugurating a reversal of images that repeated itself in other domains.

Why is there such a magical aura around the term 'development'? Why is it so sacrosanct? Has this always been so? What are the origins of the term? Who invented its usage? What are its underlying assumptions?[5]

The term 'development' is not as innocuous as it appears. The colonial origins of the concept are apparent from the fact that while considerable literature exists on it most of it is inspired and controlled by the colonizer countries, and each of the major colonizing languages possesses its own specific development terminology and debates. (Fortunately, the word is untranslatable into the 1,500 odd official and unofficial languages of the Indian Union; in Hindi, however, it has been translated as *vikas*.) The term remains a key word in our times, for it justifies many kinds of dubious actions, including enforced or induced change.

Development has divided history into two periods: the first being the period prior to the political independence of the South; the second, the period after the development ideology was launched, notably, in Walt Rostow's influential economic theory of take-off. Towards the fag end of the colonial period, as the colonized world lay beaten, traumatized, and reduced to poverty, the idea of development could find fertile ground to take root and flourish.

Accordingly, history was reassessed, national histories reinvestigated; 'developed' societies researched for those elements that were thought to have brought them success and material affluence, while 'developing' societies were criticized for the crucial missing elements. Development became an exercise of substituting what

was 'missing' in the South's psyches with new programmes engineered by western souls. No one thought it necessary to ask why the South should remake itself in the image of Europe or America, why it should adapt to their cultural goals, why it could not utilize its own technology, why it should conceal its own human face under an imported mask.

Political scientists, sociologists and economists from the West found a new role as 'development experts'. The most outrageous of these was a psychologist (David McClelland), who opined that the South's people lacked 'achievement motivation'. As André Gunder Frank parodied McClelland's 'wisdom' later: all that seemed to be required for the South's countries to become like their western counterparts was that their children be told more hero stories to inculcate in them the protestant ethic.[6]

Two points to ponder over. First, the South turned underdeveloped immediately on gaining independence. Before that it was 'colonized'. Prior to that, it had been, well, itself. Second, history before the age of development seemed of zero value, except its art. The arrogant parochialism of modernity seemed as offensive as that imputed to the small peasant rooted in his village.

Overnight, development ideology turned people into beings in dire need of superior endowments. Tribals, traditional fishermen, peasants, all became underdeveloped, even though they operated with a fund of technical expertise and skill painstakingly accumulated over centuries.

Since development was 'dynamic knowledge', it also became an élitist business, and the spread of its legitimacy made the South safe for the new ruling class. Business élites discovered in it an excellent opportunity to increase profits, importing technology that displaced labour. Scientists helped, by defining modern technology in terms of greater efficiency—which helped development enhance its prospects in an age of 'scarcity'.

Development ideology has been based on a presumption: the replicability of situations or events from one part of the world in another. The ability to master the art of scientific experiment has given the ruling classes a misguided confidence in their attempts to duplicate history in places where it has been otherwise. This remains the cardinal tenet of the development ideology. Today, for instance, an experiment in the Green Revolution is sought to be duplicated in other regions. Likewise, a successful instance of co-

operative dairying in a place like Anand, Gujarat, is replicated elsewhere in India via a project like Operation Flood, and later in the rest of the South.

Development theory is constantly on the lookout for successful models to replicate. The local situation, seen as stagnant, needs external props. One simply assumes, despite the jargon of 'participatory development', that local populations have no initiative or imagination in determining their destinies; neither do they have the competence (available easily to the moderns) to process their resources efficiently. In fact, they are constantly seen as children in need of some aid in defining the good life. This is an apolitical vision of human living.

Development theory has always been based on paternalism. When political decision-making passes over into the people's hands, development theory is the first casualty. The literature on revolution can be diametrically counterposed to the literature on development. The South was given the option of being either capitalist or socialist (communist) but not of being itself. Alternatives like the Gandhian vision, based on indigenous physical, spiritual and mental resources, were scrupulously distanced from the process of public debate by the imperial power, which sedulously encouraged forces represented by people like Nehru, who had utter contempt for their own peoples and traditions. Read Nehru on the Indian village and see how close he is to Lord Macaulay, contemptuously dismissing Indian metaphysics. Since Liberalism and Marxism are both foreign creeds, the adherents of both have maintained a rigorous disdain for indigenous categories.

Development, as currently understood and executed, must remain directed against people, and therefore must inevitably increase poverty and unhappiness under the guise of eliminating them. It seems obvious now that the idea of development has been used to induce people to accept not only enormous sacrifices ('in the national interest'), but also the mutilation and destruction of their cultural endowments and their physical and moral environments.

Development is best understood as a project through which an aggressive, expanding class seeks to expand its control and use of other people's resources and to neutralize any opposition to such programmes. A proper analysis would see development as a project of international dimensions, intimately secured and supported by

international capital, conceived and executed in the interests of the designers of the project. For these reasons, development must be destructive because it seeks to replace what exists (seen as underdeveloped, wild nature, poor subsistence) with a project conceived from the outside.

Those who patronise and support development and function as its volunteers and missionaries have merely internalized an imported concept or project the intended effect of which is to abuse settled populations or societies that do not or refuse to grant allegiance to the overall design. Therefore the active creation of victims is intended, and is not an accidental event.

Development, finally, is power. Development becomes the amply endowed mother suppressing her own milk in order to give her child contaminated bottled milk simply because she has been turned against her natural riches, just as her culture has also been made ashamed of its own inherent wealth.

Power is Development

The statement, 'Development is power', can be reversed to produce another startling truth, 'Power is development'. Less inscrutably stated, power defines development. The new power over our lives these days is the World Bank. Over the space of the past decade, the definition of what constitutes development has come increasingly under the inspiration and control of the World Bank. Symptomatic of the trend are a number of studies impressing on the reading public that the Bank is not only the most authoritative source (via its *World Development Reports*) on development, but probably the best thing that has happened to it; that its wisdom on the subject is both impartial, and in so far as it claims to be concerned for the 'poor', even 'radical'.

Two books recently published by the Bank—*Pioneers in Development*,[7] and Gerald Meier's *Emerging from Poverty: The Economics that Really Matters*,[8] are good examples of the Bank's desire to occupy the leading chair in development theory and economics. It is important to recall that most theorizing about the South and how its development should be executed was not done by the South's people, but by western experts. This is demonstrated by examining how development economics was invented in the West and then handed over to the South. The South's ruling

élites, having achieved political independence and suddenly faced with the daunting prospect of administering entire countries, returned for intellectual advice to the very countries that had governed them as colonizers. It is therefore not surprising to discover that the major 'Third World' development economists were 'First World' people: Lord Bauer, Colin Clark, Albert O. Hirschman, Sir Arthur Lewis, Gunnar Myrdal, Raul Prebisch, Paul Rosenstein-Rodan, Walt Rostow, Hans Singer, and Jan Tinbergen. These, as *Pioneers in Development* happily observes, 'came to dominate the thinking on development.'[9]

What link did these neoclassical and Keynesian economists have with the problems of the South? Very little, under normal circumstances. The independence of colonies, however, and the transformation of these into new states, produced for these economists a fresh category of job opportunities: as advisers to the South's governments. Mesmerised by the material possibilities evident in western civilization, the ruling élites sought help from those who, paradoxically, could least provide it. 'Rather oddly, in retrospect,' writes Gerald Meier, in his introduction to *Pioneers*, 'most of those who began theorizing about underdeveloped countries were citizens of the developed countries.'[10]

New Delhi for instance saw a stream of them. In India, in 1947, there were few economists worth the name. George Rosen has described the manner in which the Ford and Rockefeller Foundations provided the main think-tanks for development strategies, and quotes Douglas Ensminger on how he had better access to the Prime Minister than Jawaharlal Nehru's own Cabinet colleagues.[11] These experts dispensed advice freely, despite the fact that few of them had much actual experience of the problems of the newly independent economies. The Indian Planning Commission asked Colin Clark to prepare a note on how it might initiate economic development. Naturally, the advice was an extrapolation of what the expert had researched in his own area at home, contaminated with his own prejudices.

The only problem was that industrialization according to the western model needed an extensive niche, and countries like India had, as Paul Baran observed, no colonies. At that point in time, however, exuberance made up for sane thinking. Incompetence and ignorance were disguised in the form of theories and accepted so long as they came from foreigners who had a right to learn and

make grand mistakes. This privilege was not permitted Indians, or other intellects of the South, for their mistakes signified much more than what they did when made by foreigners. They indicated instead, in some mysterious way, civilizational incompetence. The economist P. T. Bauer, for instance, was emphatic about the economic role of 'national characteristics and attitudes', and in relation to India he wrote:

> Some of the attitudes in India which are most adverse to material change are indeed unique to the country and are especially pronounced there, such as the operation of caste system, the veneration of the cow, the reluctance to take animal life, and contemplative, non-experimental outlook.[12]

The Indian economist, Jagdish Bhagwati, has pointed out that an Australian expert invited by the Japanese government in 1915 had said similar things about the Japanese!

Only much later would these experts confess, as some of them do in *Pioneers*, that they were 'learning', and that they therefore made serious blunders. These blunders formed the basis of policies which adversely affected millions of lives. Albert Hirschman recounts, for example, how he went to work for the Colombian government in the early fifties:

> My natural inclination, upon taking up my job, was to get myself involved in various concrete problems of economic policy with the intention of learning as much as possible about the Colombian economy.... But word soon came from the World Bank headquarters that I was principally expected to take, as soon as possible, the initiative in formulating an ambitious economic development plan that would spell out investment, domestic savings, growth, and foreign aid targets for the Colombian economy over the next few years.[13]

A number of important factors made this entirely incongruous collaboration between foreign experts and the South's leaders seem natural. One, the prevailing consensus demanded a new role for the State. Besides its earlier *controlling* function, the State would now have a *conducting* function.[14] It would be the principal agent in the task of development, raising the people to the status of Americans, or whichever species of humankind that seemed attractive at the time. This new role of the State fitted in well with the prevailing model of Keynesianism.

Over and above these factors the spectre of the Cold War necessitated the containment of communism in the new nations. If it occurred, 'investment opportunities and access to markets and

sources of raw materials would then be diminished.' In the circumstances, the economic magicians would propose that development along the western path was not only possible but painless. The South's rulers need not overly concern themselves with the division of assets or the redistribution of land. Foreign skills and ingenuity could provide equally impressive economic growth, and benefits would percolate to all. This is perhaps why Walt Rostow's 'aeronautic' theory of 'take-off' was one of the most attractive and successful advertisement images of the modern era. It was also the one most inspired by the Cold War.[15]

What were the elements of the development strategy? One would have to enumerate, unnecessarily, the cardinal tenets of conventional growth theory: the Harrod-Domar model, in which saving and investment were considered the critical element for growth (elsewhere, Maurice Dobbs, too, had characterized capital accumulation as 'the crux of development'). Similarly, the Arthur Lewis model: how does one get a society accustomed to a 5 per cent saving rate attempt a 12 to 15 per cent saving rate? Then there was the Clark Fisher hypothesis, that economies advance as labour moves from primary, to secondary, to tertiary economic activity. Finally, foreign aid is the critical stimulant to move the South's stagnant economies out of any traps or vicious circles, brought on, for instance, by population increase. No thought was given to structural factors. Growth was supposed to be linear and automatic. Later, when the planners discovered theirs was too simplistic a model, they ruled that changes would be needed in values, institutions and attitudes. It is consoling to discover that they did not require an entirely new population to replace the existing one.

Development economics was nothing more than the North's mainstream economics applied to the South. Though unwarranted, it took root because of the peculiar optimism of the time. *Pioneers* makes it out to be a mature intellectual tradition, but in the absence of an autonomous tradition, the experts merely drew from their own intellectual traditions in their task of changing the South. In practice, the only option available was to experiment, and on a grand scale indeed! Neither Hirschman nor Prebisch nor any of the other distinguished economists crowding *Pioneers* would have been permitted in their own countries to drive a car, for instance, merely on the strength of knowing the principles of how cars run. How then could they have formulated policy for the lives of millions of people?

No one has answered that question satisfactorily. Not only were the economic speculations proposed with great conviction, but as 'learning' took place, policies were turned upside down, or changed overnight. Thus Rosenstein-Rodan argued for massive and balanced growth, while Hirschman advised for unbalanced growth. Neoclassicists like Bauer debated against government intervention in the market, while Singer and Prebisch would demand, and get, import substitution and protectionism, since the international terms of trade, despite Bauer's singing of their virtues, would continue to militate against the interests of the South.

One is surprised at the discord and the cacophony. Colin Clark arrogantly lampoons the Indian economist P. C. Mahalanobis in *Pioneers*, but does not mention him by name, even while Paul Streeten concludes that Mahalanobis' 'recommendations were broadly right for India at the time.'[16] While one Keynesian ruled that centralized planning was essential, the monetarists, led by Friedman, insisted the world return to a *laissez-faire* system. Since Friedman could get no one in his part of the world to accept his ideas, he was more than delighted to co-operate with the vile regime of Augustine Pinochet to ram the theory down Chile's throat. Would one permit a surgeon, howsoever competent, to operate on a patient without studying the case? Worse, what if he confidently decided to operate for the first time only on the strength of his abstract knowledge?

Where would capital come from? Some of it would arrive in the form of foreign aid, but most of it would be extracted from domestic sources. Colin Clark said the capital would have to come from the rural sector, but added that rural folk would then have to be left uneducated, if they were not to get the idea that they were being cheated. To finance economic development—or Mahalanobis' industrialization project—one did not need, as the British once did, to levy direct taxes to drain the villages of capital. More sophisticated ways existed to keep low consumption down, even if the excuse for the entire exercise in economic development was to raise per capita income (and consumption) in the first place.

The theory of 'development by imports' presented the South with the military coups of Brazil, Argentina and Indonesia. The coups were principally connected with these countries' debt crises. There have been many others. The more you borrow, said the

IMF, the more you develop. If the country cannot pay, more credit will be made available to repay earlier loans. Development became a chain-letter phenomenon, with ever more creditors being brought in to run the show.

Now the South is threatening to renege on its loans and the donor banks are hoping not to crash as a result. Capital-market lending to countries in the South has collapsed. Forty to fifty countries are involved in debt-rescheduling negotiations; naturally, control over their own resources is passing out of their hands.

Painless development?

The most unconcerned about pain was Walt Rostow. Economists are generally appalling historians, but Rostow took historiography into a wholly personalized domain, where inventing events became as innocuous as plotting growth curves. When countries like Vietnam decided that his theory of take-off concocted in the US State Department was not in their interest, he tried to persuade the Vietnamese to accept it using napalm bombs and Agent Orange.

Mayhem in theory copulating with the expediency of the South's ruling classes! The result? The South faces an irredeemable debt crisis. Its oppression has become intractable and hopeless. Today, they laugh at Africa's alleged incompetence, its fondness for droughts and famines. Which country, which people, could have survived the colonial plunder and rape of society and environment, as the African countries have? Who trained African economists? Tribals from the Congo?

The question to ask is whether these 'pioneers' were honest men? Were they not rather venal minds unable to resist playing God? I have the distinct feeling that since economic theorizing did not involve concomitant responsibility for the consequences (one cannot sue an economist as one can a doctor) there was too much speculation, too little empiricism, too much prejudice.

Have we now at least discarded the notion that we can be 'developed' by importing a set of techniques we know little or nothing about? Better still, have the magicians who tried to pass off illusions as compelling reality, given up their claims to perform normal science? Walt Rostow still feels there are economists in the South who will heed his advice (which retains its ability to change as US interests change). Four decades after India has all but chewed the idea to death, Raul Prebisch argues for a combination of socialism and liberalism for the future.

Which brings us to Meier's book, *Emerging from Poverty*. He writes about the South as if it were struggling to emerge from a manhole of great suffering. He feels the effort can be considerably aided with help from American capitalism, international financial institutions such as the IMF and World Bank, and Milton Friedman and his Chicago colleagues. 'We worry in this book', he writes, 'about what can really be done to lessen the pain of poverty still suffered daily by two-thirds of humanity.'[17] Instead, he should worry about how his own people squander the planet's priceless resources, hold the South's economies to ransom, and exacerbate the already degraded lives of millions. If that were not sufficient, he might concern himself with the billions his society spends daily on nuclear weapons, on the trillions made by peddling arms to poor countries. Yet this person who weeps for the poor, tells us the very next moment of the pleasure he and his colleagues find in the great development enterprise, 'the stimulating intellectual adventure' of civilizing people who still use their fingers to eat, or refuse to wear ties and suits.

Paul Streeten, director of an organization called the World Development Institute, in Boston, USA, says that Meier's account of the development story 'combines a hard head with a soft heart, where so often the combination is the other way around.' My own conclusion after reading Meier's book is that he has a soft heart and a soft head. This is a formidable combination for a professor at Stanford but there is not much choice available in the matter of appointments to economics posts nowadays, since the bright boys either study physics or sojourn in the Gulf. The 'dismal science' gets the leftovers.

Meier demonstrates he has a soft heart for those he socializes with, for those who sponsor his research (including the World Bank, the IMF), and for his own brand of neoclassical economists. In general, he feels, there is not much need to change present-day economic theory, it merely needs supplementary vitamins. The main structure adequately meets the demands of the world system.

At first sight Meier appears to be an impartial observer of the international scene. We then discover that this book was written with the help of the Rockefeller Foundation, which is sufficient inducement to any scholar to think improperly. *Emerging from Poverty* centres around the 'return' by the community of economists to reliance on the 'market mechanism' as the only appro-

priate means of development, and on the role of the World Bank and the 'international community' in dealing with the South's poverty. Who are these experts? As in *Pioneers*, they reappear here, equipped with neither clue nor experience, spouting the same gas, with all the affability demanded by the occasion.

Meier reviews a few 'success' stories of development in countries which followed the capitalist path: South Korea, Taiwan, Hong Kong and Singapore. Most of them are police states, where a citizen is analogous to livestock. He also repeatedly focusses on Malawi, which is a 'success story'—it takes all of South Africa's trade, and channels it to the globe, thus enabling the hated apartheid regime to operate in the world market. This, truly a 'success story', demonstrates nothing more than how some societies survive despite being an affront to human civilization. And this with World Bank aid! Meier, of course, calls it 'development'.

He feels these countries have proved that reliance on the 'invisible hand' is the best development strategy. The 'additional problems', according to our author, can be met if a new international public sector is erected, in the form of a Bretton Wood II. Meier's main conclusion is predictable: 'In spite of the critics it is fair to say that the Bank has been a predominant and constructive force in the international community even though it is still only a beginning.'[18]

The World Bank, Meier observes, has 'taken the lead in some aspects of development thought.'[19] Why should a bank, a moneylender, be interested in development theory? Later, we hear ominously that the Bank has begun 'to offer advice on public policies that affect the country's mobilization and allocation of resources.'[20] Are such countries sovereign or is he talking of colonies? Where will it end? With the World Bank running the government? The Bank is interested in 'the poor', in developing 'this immense, untapped human potential for increasing economic growth'. (The Bank's set formula about this is well-known: the cheap labour of the poor, used for export-oriented industrialization, services world markets. This will make the poor more productive, alleviate poverty, and foster growth with equality).

As for the World Bank's role in the Philippines, this is not mentioned even once in the study. Yet any analysis of 'Third World development, poverty and the World Bank' which does not consider the Philippines' case, is a fraud. The World Bank got

everything it wished for in the Philippines, including its own Cabinet. Within fifteen years, the policies it helped force on the Philippines increased poverty, bankrupted the country, destroyed indigenous industry, and left the country billions of dollars in debt. In their study, *Development Débâcle*, Walden Bello and his colleagues, basing themselves on 6,000 pages of leaked internal Bank memos and documents, showed how the World Bank had in fact 'collapsed' the Philippines economy for good. Every development strategy of the neoliberals who guide the Bank, was tested out on the Filipinos, and it crashed. There is no better proof of the Bank's total bankruptcy for development thought.[21]

Critics of the World Bank like Iqbal Asaria, Cheryl Payer and Teresa Hayter have exposed in detail the Bank's pretensions to solving poverty, pointing out that as the Bank's programmes make larger numbers of people poorer, its influence (and affluence) seems to keep on mysteriously increasing.[22]

Any person who therefore feels the World Bank has any contribution to make to poverty, except increasing it, should have his head examined or his background investigated. A number of people within the South have some sympathy for the Bank's approach, but this is in direct proportion to their stints at the World Bank and the generous pensions they draw from it. The actual role of the Bank was documented and appraised by the US Treasury Department in its report, 'US Participation in the Multilateral Development Banks', which noted with satisfaction that the institution 'faithfully promoted not only strategic US economic goals but short term political objectives as well.'[23]

Edward Goldsmith, editor of *The Ecologist*, recently wrote a five-page open letter to Mr Clausen (while he was President of the Bank), accusing him and his institution of ruining the South's environment, and pauperizing millions of people.[24]

In the face of this flak, one can understand why propagandist books extolling the Bank's global image have been sponsored. The Bank is basically a money-lender, so why is it interested in appearing as a theorist of world development? The answer is not too difficult to find. A new theory is required which will legitimate the next phase of continued domination of the international system by world capital. The continuation of industrial civilization is necessary for this. On the other hand, the populations of the South require major stocks of primary commodities, including food and

fuel, in order to survive. Their requirements are outside the pale of industrial culture as we know it. But their right to their resources was unquestioned. However, today this right is being eroded; new development theory can erode it further.

The Bank's opinion is that the most efficient processors of 'scarce' resources are the TNCs and their institutions. The poor can at best supply labour in a predetermined form set by the TNCs. The Bank's overt war against poverty in its published documents becomes a war against the poor in its actual policies. Goldsmith has detailed the numerous ways in which the bank accomplishes this, and they need not concern us here.[25]

In sum, books like *Pioneers* and *Emerging from Poverty* illustrate, if anything, the truth that economists, howsoever distinguished they may be, have a poor sense of when to retire. What was needed in these World Bank-sponsored books was a confession and apology. What we need is access to economists who can transcend the irrelevant categories of this group of clumsy, aging experts, better kept in museums. All 'pioneers' need not be followed, especially when, as with these, they promise us pleasure but can only deliver us instead to ever vaster seas of pain.

In 1978, a group of us began a development project in Sattari Taluka (north-east Goa) on the outskirts of a group of seven villages whose headquarters was the village of Thane. We had come to Sattari with the idea that our presence there would help improve the living conditions of the rural folk. We thought we would set up a number of programmes that would enable rural folk to better their conditions. We had done no prior survey as to whether we were really required there or not.

Our project failed, as most projects do, but we learned a great deal more from the villagers than we, in the arrogance of our academic learning, could ever have dreamt of teaching them. We were not part of the structure of those villages but that was not a great problem, for the villages in Sattari, as with villages in other parts of the country, are normally subject to constant interventions from outside in the form of traders, itinerant salesmen, revenue and bank officials and so on.

The lifestyle of the villages had a certain continuity with the past—it was based on the cultivation of paddy, much of it for self consumption, and two crops were generally taken in two different

sets of fields every year. It was not strictly speaking a cattle economy, though some families owned a large number of cattle which survived basically through free-range grazing. On the outskirts of the village, however, were small hamlets of Ghavli Dhangars in whose hands most of the milk production remained.

Though modern civilization in the form of buses, a road, and electric poles, had touched the village, the major portion of the villagers' lives remained independent of it. That is to say, the villagers would carry on their business of survival with or without external interference. In many ways suffering, discomfort, hardship had become endemic. This should not conceal the fact that the villagers' capacity to function as primary food producers, often using their own inputs, remained intact. The decisions that they were compelled to make in their struggle to survive, using a minimum of available resources, underlined the fact that they were not children or ignorant folk, in need of constant care and charity, or 'development'. (In *The Intimate Enemy*, Nandy refers to the large masses of India's people who over the past decades have refused to play the games of the West, particularly the paramount *tamasha* of 'development').

Unlike the intellectuals of our universities, who are steeped in the history of the modern world and are unable to function meaningfully without reference to its main preoccupations, the villagers of Sattari could aptly be described, in Nandy's term, as 'non-players' of history. For them, history, as those trained in the western academic tradition would understand it, does not exist and what does not exist, can be presumed not to matter. They give primacy to myth and the enactment of the mythic consciousness in the various forms to which they have become accustomed. This is the first major characteristic of the non-players. The obsession with history which drives modern civilization is of doubtful utility, like some new variety of high-yielding seed. The historical consciousness need not exist at all. The village of Sattari proposed a cosmic interpretation or world view that was distinct and entirely different from the consciousness that modernity thought important.

The ability of these villagers to disregard history and operate independently of it relates to their capacity to be able to feed themselves. Once this capacity is removed, a steady disorientation inevitably results. In such circumstances it is relatively easy to be incorporated into less integrated ways of being. Thus, those who

do not have an autonomous means of livelihood, but are in or dependent on economic relationships with institutions, individuals or classes, have little ability or opportunity to generate unique knowledge or to be secure in formulating personal visions distinct from the consciousness of those who control them. In this, the peasant is much better off than the President of the World Bank.

Parra, the other village where I now live, is located in a more 'developed' part of Goa. This 'development' means that there are more roads, a larger number of bus services, more doctors, higher wages and hospitals, schools, and a larger number of houses with electricity. But underneath this more accessible infrastructure, the lifestyle and the cultural autonomy does not differ in great degree from that of the peasants of Sattari. The main preoccupation remains agriculture, but here instead of two crops, only one is grown, while the fields are put under leguminous cover in the post-harvest period. Here too, subsistence guarantees autonomy. The greater the reliance on subsistence, the less dissociated the personality. Economically, villagers stake out their independent niches to exploit for survival.

The village no longer operates as a community that looks after the welfare and well-being of all those within its boundaries. Nor does any extra-village authority for that matter. People cope with survival tasks using their own ingenuity, and tradition helps them by guaranteeing them access to the niches exploited by their ancestors. Hence it is absurd to describe the villagers of Parra as underdeveloped or developed. They constitute a normal society, in the main autonomous, and able to determine with responsibility what should be the larger boundaries of their involvement with others and the outside world. This is not to claim that they are infallible, but that they are as fallible or infallible as people with greater access to income and commodities elsewhere.

Development and developers on the other hand view such autonomy and patterns of subsistence with impatience, intolerance and horror. The developer is impatient to change this pattern of life which he considers stagnant, vegetative, repetitive, in need of greater rationality and 'openness' to the 'benefits' of modern science. He is also keen to change it because he is the direct beneficiary of any changes he proposes.

In all drives for development, one can distinguish in fact two categories of people. First, those who may be well-meaning but are

entirely presumptuous in feeling that their way of life is inevitably superior to what they see before them.[26] The alleged superiority, of course, is an unwarranted assumption. There is another class of people, less naïve, more powerful, who in determining that those belonging to other cultures are inferior, actually disguise their own eagerness to expand their control over others' resources. Capital's fundamental expansionist drive is blocked by the intransigence of subsistence, the latter but an alternative form of capital accumulation. It is therefore not fortuitous that development, in collaboration with science, is posed as superior to subsistence based on tradition. That is only a prelude to development taking over the domain of subsistence.[27]

It took me years of living in such village environments to realize that development should never have been counterposed to poverty, but to subsistence. Before we entered the village, it was by and large a self-sufficient economy. The environment was 'undeveloped', and villagers had access to what it offered. With development, large tracts of land were placed at the disposal of companies and horticulture farms, the forest department cut off the forest from the villagers, the milk from the village cows was taken to the city, and water was used up by the companies for their cash crops. Development had appropriated their common resources and turned subsistence and local autonomy into dependence and poverty.

Development, in other words, is nothing less than propaganda about a way of life whose superficial veneer hides a host of depraved realities including the threat of total annihilation of all life (ozone depletion, global warming, nuclear warfare or nuclear accidents) or, as with the microprocessor, the total redundancy of all human labour.

Nobody has asked if this is necessary. For centuries, Indians were Indians, but now it seems it was wrong to be so. It was wrong to be non-western in consumer preference or lifestyle. It was wrong not to have developed traits associated with the western personality.

We would be forced to be free, since we did not know the extent of our own 'bondage' to our past and our traditions. We would be forced to be free from an undue concern for human values or the shared identity of community. Leading western intellectuals told us

what was wrong with our culture, and which old element impeded rapid economic development and needed to be discarded. It is surprising, indeed, considering the pervasiveness of the disparagement of indigenous culture, that these intellectuals and experts did not ask why Indians or Chinese or Brazilians or Ugandans had existed at all!

Development became coercion: *ujamaas* and forced co-operatives, tying people in new forms of organization 'for their own good'. Abel Alier, Sudan's Southern Regional President, during an assembly discussion of the controversial Jonglei Canal said: 'If we have to drive our people to paradise with sticks, we will do so for their good and the good of those who come after us.'[28]

It has worked according to plan. In the name of development more people are consciously deprived of their rights and livelihood in the South today than in colonial times. In fact, as we have already remarked, people's rights are taken away and substituted by a litany of people's needs, which are defined by westerners. In the name of development, science and technology, modernization and foreign exchange, a justification is provided for bartering one's dignity and self-respect, and the country's valuable resources; even while modern economic theory continues to preach that the people of the South can only be helped by catering first to the affluent of the planet.

There have been numerous (and welcome) critiques of development. Some of these have labelled present-day projects as resulting in maldevelopment; others have spoken of perverse development and underdevelopment; just as critics have indeed decried the perversion of science and technology. But just as there are few criticisms of science as such, so there are few who object to 'development'. Thus there has been no worthwhile critique of development as ideology, and propaganda. The impression is that development is an obvious good.

The time has come for a frontal attack on the ideology of development, and, by implication, on development experts and theorists. There is no such thing as a developed or an undeveloped person in today's world. There are only people, living in societies most of which seem to have been traumatized. Most people in their societies are preoccupied not so much with technology as with ordering personal values in a hierarchy that is often unique to each individual, so that it is possible, in principle, to propose that there are billions of such hierarchies determining people's lives.

People in these societies, whether they be in Amsterdam, Nairobi, Bombay or Kuala Lumpur, function as adults, preoccupied with similar tasks of survival, of incorporating meaning, of venerating symbol. The organization of societies around play, ritual, drama and art is hardly a phenomenon of the past. Some societies may have greater access to certain goods, others, less. But this is because inequitable access to, and control of, resources was enforced in the period of colonialism. The world has never been quite the same since.[29]

We need to regenerate, recreate and restore human ends that stand outside the totalitarian obsessions of the development era. We need to examine 'undevelopment' as a value, and explore how it can be given political space. Uncontaminated nature seen, for instance, in the form of a virgin forest is a good example. The world-wide movement to save those forests is part of a global trend to look at the hitherto ignored values of undevelopment. Tribal communities are another. These, in so far as they have not yet suffered large-scale external intervention, are still in a sense natural, but it is also possible to see undevelopment in the midst of development, as we have recounted of life in Thane and Parra.

5
Ending Development

We have argued that development, as officially sponsored triage, is another term for plunder. In order to conceal its goals, development engages in duplicity. It proposes peace, while exercising war; claims it is a *sine qua non* for prosperity, even while laying out the institutions that will immiserise and pauperize the millions who are rejected from participation in its enterprise. For these reasons, and since it passes off the interests of the ruling powers of the globe as the universal urge of mankind, it is also ideology.

Development is in effect totalitarian, for both the etatist and liberal traditions believe unquestioningly in its promises, accept its assumptions, and insist on universal allegiance to its momentum of induced or coerced change. The ideology is played out basically in the South, where painless prosperity is constantly promised but rarely achieved, while actual strategies of development are based on an uncontrolled but guaranteed distribution of pain. The transfer of such development would have been an unqualified success had it not been for the peculiar but basic human need to revolt against all forms of oppression and control.

The more optimistic part of this book chronicles the revolt against development from the battlefield, compiles a preliminary history of anti-development wars for posterity, and introduces a number of anti-development thinkers. Sufficient territory for the moment.

The Anti Baby-Food Campaign

If there is anything that is well documented for countries of the South, including India, it is not only the inroads made by tinned food in child feeding practices, but also its miserable effect on the lives of infants, often leading to their diarrhoeal contamination and

death.[1] In 1974, concerned about this senseless human tragedy, a number of action groups in Europe ignited an anti bottle-feed campaign that more than a decade later has continued to reverberate throughout the globe. An English group, War on Want, basing itself on material prepared by the *New Internationalist*, published a booklet called *The Baby Killer*, an investigation into the promotion and sale of powdered baby milk in the South.[2]

In May 1974, the Third World Group in Berne, Switzerland, translated the War on Want document into German, but used a new title: *Nestlé Kills Babies*. A month later, Nestlé filed a suit against the group on four specific counts: one, that the title *Nestlé Kills Babies* was defamatory; two, denying the charge that the practices of Nestlé in promoting baby food were unethical and immoral; three, denying that Nestlé was responsible for the death of, or the permanent physical and mental damage to thousands of babies by its sales promotion policy; and four, denouncing the accusation that in the South, Nestlé sales representatives dress like nurses to give sales promotion a scientific appearance.

Two days after the first hearing in Berne in November 1975, eight multinational companies in the infant food sector established an International Council of Infant Food Industries which published a 'code of ethics' and professional standards for advertising product information and advisory services for breast milk substitutes. By the time the trial ended on 24 June 1976, Nestlé had withdrawn three of the four charges. District Court President, Jurg Sollberger, found the title *Nestlé Kills Babies* defamatory but fined each of the thirteen members of the Third World Group a token 300 Swiss francs. However, said the judge, Nestlé was not acquitted. It must thoroughly reconsider its promotional practices.

By this time, War on Want in England and the Interfaith Centre on Corporate Responsibility (an ecumenical agency of the National Council of Churches in the USA) had also joined the campaign. The Sisters of the Precious Blood, a religious order, even filed a law suit against Bristol Myers (another baby-food producing company) because the company misled shareholders about its sales promotion practices in the South. In 1975, Peter Krieg of West Germany produced a film, 'Bottle Babies', which won the silver medal in the International Science and Technology film festival in Tokyo the next year. In the meanwhile, *The Baby Killer* was translated into Danish, Dutch and a number of other European

languages. Eventually, voluntary groups worldwide got together to form the International Baby Food Action Network (IBFAN) which has since successfully co-ordinated the anti bottle-feed campaign.[3]

These efforts on a voluntary scale have now been supported at the establishment level. For example, WHO, the FAO, the UN Protein Calories Advisory Group, and the International Pediatric Association, have issued official statements about both the crucial importance of breast feeding and the necessity to curb advertising of substitutes. The most outstanding of these official initiatives is the WHO Code on the marketing of breast-milk substitutes which is now accepted as the basis for numerous national codes in both North and South.

Importantly, the movement against the bottle feeding of infants in the South was not led by medical science. The campaign to bring a halt to the infant-formula companies' unscrupulous methods of selling their products in the South was initiated by activists. That a few scientists supported the activists does little credit to medical science as a whole, which even today is more concerned about formulating and inventing more of such development than about the massive harm that such development visits on the health of children. In fact, the companies continued to boast, as Nestlé did, that their scientists working on infant formula belonged 'to the top'.[4]

I have begun this 'history of anti-development' with the baby food issue because it remains a major symbol of the revolt against the development paradigm. The incontrovertible association of infant formula with development means that any effort in favour of breastfeeding is inevitably against development. In other words, the return to breast feeding in the western world itself signalled an abandonment of the benefits of development for a return to reliance on natural resources. It also indicates the simple truth that humanity (and *ahimsa*) will be preserved only if it acts resolutely against development. The anti baby-food campaign was led mainly by activists from the North. The issue involved was a global one.

I shall now restrict myself to a history of anti-development initiatives originating mostly within the South. Here we have even more numerous illustrations of the wars between people and development, between the indigene and the exogene, the traditional and the modern. A perusal of this history shows that it might

be possible to question the bonafides of development irrevocably, turn it upside down, and check its spread. Let me begin by introducing the reader to Appiko, a mass movement that arose in south India to protect forests.

Tree People

In the Mandal forests of Chamoli district in the upper reaches of the Garhwal Himalaya, illiterate tribal women commenced a unique movement a few years ago to embrace (*chipko*) trees marked for the axe, and thereby entered history. The fierce passion of the Chipko movement immediately captured the imagination of people everywhere and soon crossed into legend. It had accomplished what Acts of Parliament and numerous exhortations from armchair ecologists and environmentalists had been unable to achieve: to sharply reduce, if not end, the large-scale destruction of forests in that region.

Much has already been written about the Chipko movement and I will not not dwell on it here; the reader is referred to the many excellent monographs on the agitation which commenced about 1972 as a self interest agitation.[5] Hill people, sore about the fact that trees had not been auctioned to their small co-operative but to an Allahabad-based firm, decided that no trees would be cut at all. Whenever the contractors to whom the trees had been auctioned by the Forest Department arrived to fell them, the village and hill folk blocked the operation by hugging the trees. Eventually, the movement graduated into a popular campaign to protect the environment of the Himalaya (increasingly prone to floods and landslides) from the heavy demand on the forests made by the Forest Department. The Chipko agitation finally achieved a total cessation of all felling in forest areas in the western Himalaya.

The idea of embracing trees travelled south to Sirsi in Uttara Kannada (in the state of Karnataka) and the Chipko Andolan put on new feathers to become the Appiko Chaluvali of Kannada. The Appiko chaluvaligars first struck on 8 September 1983 in the Kelase forest where a forest department contractor turned a coupe assigned to him in auction into a slaughterhouse.

Sundarlal Bahuguna, one of the country's most popular and endearing environmentalists, had arrived in Sirsi and delivered an oration to the village youth in August that year. There is no record

of what he said, but from what happened a few weeks later, it can be surmised that his talk had provided the catalyst for action. Bahugana had journeyed to Sirsi to enquire about the well-being of his young lieutenant, Pandurang Hegde, a callow small-town unemployed youth, who could not afford even a bicycle, dependent for his sustenance on fistfuls of grain collected from village women. As the world slept, these two despairing optimists discussed fresh projects to stay the earth from losing her green skin, while representatives of the Laksminarasimha Yuvak Mandal sat around and listened.

In September 1983, members of the Mandal had read a news item in their daily paper which announced that the Forest Department henceforth would permit the felling of only two trees per acre of forest. In the Kelase Forest, however, when Appiko activists went to count the trees felled, they were shocked to discover that thirty-five had been mowed down in place of two. The felling continued, despite a message to the Forest Department. The next day more than a hundred men and women rushed to the forest and obstructed the axe-men in their task by surrounding and embracing the trees marked for death.

On the occasion of Van Devata (a festival of the forest deity), Appiko activists and villagers took a vow to protect trees at the cost of their lives. It is a commitment people here instinctively understand. This region produced the literary giant, Shivram Karanth, Yakshagana, and a folk language heavily infused with symbols of trees and forests. What will this literature be like once the forest is gone?

But why think of such a dreary prospect? Of the 3,360 trees marked for felling in the Bilagal forest following the working plan for the division, the Forest Department, bowing to pressure from Appiko chaluvaligars, had agreed to cut down a mere 370. This was soon extended to other forested areas. By the end of 1983, Shyam Sundar, Chief Conservator of Forests, Karnataka, in a letter to the *Indian Express*, deplored the fact that 'logging work in all the ten coupes in Sirsi forest division comprising the two talukas of Sirsi and Siddapur has now been stopped by ardent followers of Chipko. These are the coupes which should have yielded firewood for running the depots during 1984.'[6]

Yet the Appiko movement was merely a year old. In the months to come it would spread to Bilagal forest and other talukas and

villages. In 1985, it reached the neighbouring Shimoga district—another area dense with forest. Leading the drive against felling were the local Yuvak Mandalis which had grouped together to form the Parisara Sanrakshana Kendra (Environment Conservation Centre). If the Mandalis permitted trees to be felled at all, this was because they had to consider the needs of townspeople for fuelwood till other alternatives were located. They also decided that within four years no felling of trees in forest areas would be permitted.

In addition, the Mandalis imposed several conditions on the foresters: they should be informed of every felling scheduled to take place in their area; trees should not be felled within 100 metres of any source of water, or if they had sprouted amidst rocks and stones, or on 30-degree slopes and beyond. No green tree would be felled in an over-exploited area, so that the forest could regenerate itself.

With the imposition of these conditions, contractors became nervous, but no one was more livid than the officials of the Forest Department of Karnataka. In their eyes, the movement was too radical, and these youthful attempts to acquire social control over forests would set a dangerous precedent for the rest of the state and the country. But support for the activists soon came from unexpected quarters.

Professor Madhav Gadgil, of the Indian Institute of Science, wrote a letter to the Deputy Conservator of Forests, Sirsi, recording his impressions of a field visit to the Kelase forest where Appiko chaluvaligars had intervened. After making a detailed inventory of trees cut and damaged in the auctioned coupe, Professor Gadgil concluded: 'We thus agree that both the contentions of the Yuvak Mandali, namely, excessive damage in the course of felling and excessive concentration of trees marked for felling were in fact true. The Yuvak Mandali should be complimented for having brought this to the notice of the authorities. It is obviously in broader interests to seek their continued cooperation in ensuring proper protection of forests.'[7]

Gadgil went on to recommend that the Yuvak Mandali at Salkana, as well as other agencies who showed an interest, be involved in the process of conservation 'at all stages'; that the Mandalis be informed whenever a forest coupe was set up for auction, and their help sought 'in supervising the process of

marking the trees as well as their actual felling'; and that these organizations be encouraged to involve themselves in afforestation efforts.

But a people's movement must inevitably draw flak. On 2 November 1983, the Deputy Conservator of Forests, Sirsi, wrote to a forest contractor suggesting: 'In case you find any obstruction from the members of the public under the garb of 'Chipko movement' you may seek police assistance for smooth working.'[8]

Matters came to a head in Sirsi at a meeting between Shyam Sundar and Appiko activists. Sundar refused to accept that the Forest Department could be taught its business by village folk, while the Mandali members insisted on a total ban on felling. The meeting ended in disarray.

Professor Gadgil, who is in close touch with the Karnataka Forest Department, later met Shyam Sundar and, expressing regret over the incidents, allegedly agreed to write an article to show how the line of action adopted by the organizers of Appiko was likely to result in 'greater harm than good to the forests.' Gadgil's *volte-face* had occurred in the space of a brief four months. Apparently, Appiko threatened the role and contributions of 'professionals' including 'ecologists' by its tendency to operate independently of, sometimes even contrary to, the advice and authority of both.

The article that Gadgil promised Shyam Sundar appeared in the *Deccan Herald* a short while later.[9] It painted the activists as extremists who hamper genuine developmental efforts.

Meanwhile, Shyam Sundar launched his own media campaign against Appiko. In a press note, he warned them that 'the urban people might invade the woods for getting firewood if its supply was stopped because of the Appiko movement.'[10] 'How many trees can you hug and save?' he sneered another time. In every case, where advance notice was available, Appiko activists had halted logging operations. In the forest near the hamlet of Mandemmanne in the Vanahalli area, for example, loggers brought down seven trees before activists arrived at the scene, and nothing after that. After waiting for three months the loggers finally departed.

Both Gadgil and Shyam Sundar reiterate that 'we must and will inevitably industrialize.'[11] According to them, Appiko activism will affect economic development through its 'negative' approach. Factories reliant on wood as raw material will shut down. The Appikos agree. They will close eventually when the forest is exhausted, so why not now?

The manufacture of plywood, for example, is inimical to the very existence of forests. A single plywood unit can eat up an entire jungle of trees valuable to man and beast: honey trees, medicinal trees, fruit trees, both giant and small. The Indian Plywood Company now obtains raw material from places as far away as Assam and Burma. The company began with a restricted diet of eight species of trees. Today, it consumes fifty-five. The Swedish multinational, WIMCO, has chopped up for match sticks the most beautiful trees that could exist in natural forests—trees which provided honey in their upper reaches and flowing rivers at their feet.

This is the reductionism of progress: a virgin forest, a community and habitat for millions of living creatures, can be reduced into a four-tiered sheet of wood stuck down with glue, or into matches. Once the forest stock is depleted, the lands are recorded as 'degraded' in forest books. Scientific forestry management will next proceed to raise in those areas pathetic plantations of shrivelled eucalyptus which our forest officials now deign to call forests.

Neither the Indian Plywood Company, nor the West Coast Paper Mill, nor Harihar Polyfibers, nor WIMCO, can ever compensate in any way for the incalculable, irretrievable loss that the Western Ghats have suffered because of their colonizing, predatory activities. Those splendid trees are never to return. In their place, because the forest canopy has been opened, is the ubiquitous eupatorium weed. Rivulets and streams have dried up. New and dangerous diseases have appeared. (The Kyasanur Forest Disease that appeared in the Beltanghady taluka of Dakshina Kannada claimed seventy-five lives in 1985 alone. In 1983, more than 1,000 people were affected and ninety died. The victims have been mainly women and children who collect fuelwood and grass from the forest. The disease is caused by a monkey-borne virus and the National Institute of Virology has confirmed this virus is related to the clearing up of virgin forest areas).[12]

The Forest Department pretends to ecological concerns but its manual of operations is based on the assumption that the Conservator of Forests is what he was in British times, a conservator of revenue. This is diametrically opposed to the conservation of trees. The battle between Appiko and the Forest Department is the symptom of a larger, burgeoning conflict—between the villagers

(in this case, of Sirsi taluka) and the populations in the towns and cities. In this confrontation, the Forest Department's role is that of a *dalal*.

The Sirsi region has a highly-developed economy, producing a wide range of agricultural commodities including areca nut, black pepper, cardamom, banana and paddy. To talk of 'developing' this area is frivolous. The people are self-sufficient, and reasonably well-off; they can afford to drink buttermilk, something not possible in White Revolution areas. Their fuel comes from gas plants and from areca tree wastes, not from forests. But without the forests, their agriculture would disintegrate. Farmers recognize the value of the forest in providing stable water supplies. Because this is a hill area and therefore relatively inaccessible, farmers rely on green manures for maintaining crop productivity. In fact, most of the varieties of plants grown here are selected for their response to green manure. It is a highly sophisticated, developed agriculture, elaborately constructed with experience garnered over decades.

The colonial state, acknowledging the intimate relationship between the forests and the agriculture of this place, granted farmers permanent rights to the so-called betta lands, or forest areas from which farmers could harvest leaves. The post-colonial state, on the other hand, is committed to industrialization following the western model by all possible means. The industrialization policy requires the transfer of millions of villagers to major metropolises. Their fuel needs must be met, and they have to be given employment partly through processing the gigantic forest resources the country inherited.

Industry sees no trees. It does not recognize that every tree has roots which have an earth-staying function, and branches and leaves that have an earth-renewing function. The barren clarity of the industrial mind reduces the tree to biomass, to pulp, grist for paper mills, plywood factories, match units and other wood processors. The city's relationship with the forest, and therefore with agriculture based on forest inputs, is predatory. The city is not compelled to grow its own wood for its fuel needs. It is given unlimited access to rural hinterlands and their capital stock.

Tragically, this disruption is for a temporary development. After the area is of no more use to the developer, the factory closes its doors and migrates elsewhere to repeat the same process. The area in which the development occurred is left to cope with the after-

effects of the development, more often without even the resources the area was originally endowed with. Despite knowing that this development is not sustainable in the long term, the state legitimizes it.

Two problems arise. The Indian Constitution grants to all its citizens equal rights. In theory, at least, there are no second-class citizens. One cannot therefore arbitrarily destabilize the economy of a region like Sirsi merely to cater to the demands of another category of people located in the city of Bangalore. Second, the state is under pressure, national and international, to appear progressive and mindful of ecological values.

Faced with such a dilemma, the state will seek endorsement from government-owned, establishment-oriented ecologists or experts that the policies it has embarked on are not contrary to environmental concerns or 'science'. What can be predicted is that the experts in turn will refuse to take account of people's wisdom.

This country's forests were maintained by its village folk and its tribal communities, till British imperialism broke off that symbiotic relationship. Neither scientists such as Gadgil, nor government bureaucrats, if one were to go by the (now aborted) new draft Forest Bill, have any desire to return the forests to local management. If this were done, their own roles and spheres of influence would decline. Some argue that vibrant forests and people coexisted happily in the historical past, but that we now face a changed situation. Therefore state authority is essential to protect forests from people.[13] (Nothing is said about protecting forests from the state).

The arrival of Appiko, however, indicates that a relationship between people and forests still exists, and in areas where it does not, it can be created afresh. It is also true that this relationship has been degraded in certain areas. For example, researchers have pointed out that the betta lands in Sirsi division are degraded due to indiscriminate overexploitation of leaves, and that this has prevented the healthy regeneration of lopped trees. This is where the Pandurang Hegdes play their role by updating people's science. One major task undertaken by Appiko activists is to educate people on how to improve the health of betta lands. It is a job neither ecologists nor foresters will be able to undertake, for both are alienated from the interests of village folk and their knowledge and practices. Appiko activists have also begun a major effort to involve people in planting local species of trees.

Villagers are being helped to transcend their immediate interest and consider the larger concerns involved in the preservation of the biosphere. The Chipko movement in Chamoli was sparked off by a dispute between the local Society and the Forest Department over an allotment of trees for felling and processing. But it graduated to a more complex understanding. Appiko began as a movement to protect forests and the agriculture dependent on it, but it has passed beyond that stage to a wider consciousness of more important ecological tasks, particularly the conservation of the Western Ghats, the oxygen banks of the nation.

Bumping along the kutchcha road from Mandemane back to Sirsi town, through patches of lovely forest, I searched my mind for an appropriate phrase to describe what these ordinary souls, Appiko chaluvaligars, Yuvak Mandalis, Chamoli women, Chandi Prasad Bhatts, Bahuganas and Pandurangs mean for our times. In *The Dream of a Common Language*, Adrienne Rich, speaking the universal language of trees and of enchantment, seems to describe the significance of such incurable romantics as the Appikos:

> My heart is moved by all I cannot save
> So much has been destroyed.
> I have to cast my lot with those
> Who age after age, perversely,
> With no extraordinary power,
> Reconstitute the world.[14]

In India, forest 'satyagrahas' have been a common feature since the British colonial power attempted to restrict the usufruct rights of forest dwellers and village communities. One instance in the Kumaon area has been graphically described by Ramchandra Guha in his essay, *Forestry and Social Protest in British Kumaun, 1893-1921*.[15] Protest against the reservation of forests by the state has been a principal recurring cause in numerous peasant and tribal movements.

The Chipko movement did not originate with official agencies or environmental groups, but with grassroots folk. This seems to be the pattern in most areas; development is counterchecked first by the people's perceptions. One of the most persistent of such battles in India has taken the form of a 'tree war'.[16]

The Bihar government set up a Forest Development Corporation in the Singhbhum district of Chhota Nagpur to grow commercially useful species of trees on the National Commission of

Agriculture model: the corporation decided to replace the native sal trees with teak which are of little use to the local tribal population.

In 1978, after patiently petitioning the government against this development, the tribals decided to take action. They entered government nurseries, uprooted teak saplings, and in one major incident, locked up forest officials for nearly a day.

The local administration treated the matter as a law and order issue, opening fire on demonstrators and arresting hundreds of tribals. More than twenty-five tribals were killed in the police firing. The sal tree on which the Adivasis depend became a symbol of the agitation, and teak (*sagu wan*) the obvious symbol of an oppressive state.

By mid-1980, tribal opposition was transformed into the Jungle Kato movement. Tribals would invade teak plantation areas and mow down hundreds of trees. In September 1980, such agitations finally led to the Gua massacre. Tribals who had gathered to protest and *gherao* the forest range officer at the iron mining township of Gua in Singbhum were fired upon by the police. Thirteen tribals were killed and more than 200 arrested.

A report in *The Times of India* of February 1982 states how 'development' was now finding it increasingly difficult to even enter the district: 'The Bihar government's writ does not run in the parts of the jungles under the jurisdiction of the Gua, Tonto and Chakradharpur police stations. Officials of the forest department here frankly admit that during the past one year even Adivasi forest guards have not been able to enter the Songra range in Kolhan division, the Santara range in Porhat division and several other dense jungles are virtually ruled by the tribals.

'Without anybody to check them, the tribals are indulging in indiscriminate felling of trees. Almost every second day there are reports that trees have been felled over another 50 or 100 acres. The Singbhum forest accounts for 30–40 per cent of the revenue of the state government from the jungles. But for the past two years the working of the department has been completely paralysed here. Since the agitation began two years ago, forest department has been sustaining a loss of over Rs 2 crores a year.'

Another major instance of an anti-development forest movement, this time involving the World Bank, concerned the Bastar tribal region, where development sought to replace the natural

forest with tropical pines. In 1975, the Madhya Pradesh State Forest Development Corporation published a brochure announcing its strategy of clear felling areas of mixed forest in order to raise plantations of teak and bamboo. As a prototype project, the corporation took 8.2 million dollars from the World Bank to clear 20,000 hectares of natural forest in Bastar district to plant tropical pines. The pines were scheduled to end up as pulp in a Rs 250 crore paper mill, which would eventually produce 50,000 tonnes of pulp every year. Consultants from the World Bank and from England, on their usual development mission, denied that the project would have any adverse ecological consequences.

A senior Indian official, however drafted a detailed note against the project on both ecological and social grounds.[17] Inevitably, development imposed itself in the district in the form of bulldozers, power chainsaws, power winches and trucks. The local Adivasis opposed the project and began uprooting many of the pine saplings. As a result, and despite the state armed police being called in, the project was abandoned by 1982.

In another part of the South, the Philippines, a major pine tree plantation project involving a similar substitution of natural forest was also defeated. The 1 billion peso project sponsored by the Cellophil Resources Corporation (CRC) was pitted against 55,000 tribals, the Tinggians. The CRC project authority had announced that its pine tree plantation, involving sophisticated processing technology and specialized field crews, would enable the Tinggians to make a quantum leap into the industrial age.[18] By 1978, however, the Tinggians' opposition to the project had begun to attract national and international attention. The administration reacted with a massive public relations campaign. The Filipino military even purged the mayor of an anti-CRC municipality, and stepped up its harassment of Catholic clergy working in Tinggian parishes, forcing many to leave the province.

In 1980, the New People's Army (NPA) sent a unit into the area and found many young Tinggians willing to take up arms to defend themselves against the violence of the company and the army. The presence of armed NPA units and increasing tribal unrest forced the CRC to cut back logging operations, and eventually the operations had to cease. Today, CRC has become a billion-peso white elephant in the region.

In India, the rebellion against industrial plantation forestry has

continued in the plains. Major battles are being fought in Karnataka and Rajasthan on the issue of planting eucalyptus on farmers' fields and on so-called degraded forest and common village lands. On 8 August 1983, villagers from Korategere taluka in Tumkur district, Karnataka, entered government-owned nurseries in the area, and pulled out thousands of eucalyptus saplings and destroyed them. A week later, they invaded another forest nursery and removed eucalyptus seedlings after discovering that eucalyptus plantations in their neighbourhood started by the Forest Department had affected water sources in their villages. The state government could only file cases against the villagers *en masse*.

In another region (Shimoga), villagers have continuously resisted government moves to turn over large tracts of forests to a new pulpwood corporation which seeks to stock these lands with eucalyptus.[19] The corporation was officially sponsored by the state. Eventually after sustained agitation and court action, the government was finally compelled to seek to close down the corporation.

One of the major victories for nature and against development was the salvaging of the Silent Valley forest in Kerala due to massive protest from all sources: local, national, and international. The case is significant since the main thrust for the project, which was to generate 120 M W of electricity by submerging one of the virgin forest areas in the region, came from local politicians and a few local people seeking privileged employment, as is often the case in projects that promise development of this kind. The project was eventually abandoned on ecological and other grounds. The story of the planning and eventual demise of the Silent Valley Project, dramatically told in Darryl D'Monte's *Temples or Tombs*[20] provides a major example of how the modern world can be pressurised into halting projects that are destructive of the environment.

Another major attempt to obliterate the rights of tribals and forest dwellers, which was eventually suspended, arrived in the form of the Government of India's new Forest Bill. Government officials, eager to lay the foundations for a new legal policy that would make government control over forest resources absolute, had often indicated that the rights of villagers and tribals to such resources constituted an unwarranted burden on the economy, industrial development, growth and the national interest including ecology.[21]

The new Forest Bill sought to extinguish whatever remaining rights tribals and peasants had retained to forest resources in their environments.[22] The Bill was scheduled for introduction in 1982. It was beaten down by a coalition of groups ranging right across the ideological spectrum, including Gandhians, Marxists, radicals, those working with tribal projects, tribal associations and institutes.[23] More than five years have gone by since the Bill was defeated through sustained public pressure, and in its stead we have a new Forest Policy that seeks, rhetorically at least, to meet the needs of village and tribal communities in the vicinity of forests and within.[24]

These anti-development victories are of great significance. First, despite the demands of development, the rights of tribal and village communities to subsistence within forest environments is guaranteed in principle and practice. Second, the NCA's recommendation of replacing natural forests with man-made plantations is now regarded as ecological barbarism. In fact, certain forest areas have been given the status of sanctuaries or biosphere reserves. In these areas, scientific forestry is in retreat. Industrial development projects which sought to uproot subsistence and usurp common resources have had to be suspended or given up.

Countering the Green Revolution

A major (and heartening) onslaught in the early 1980s by Filipino farmers, peasants and scientists against the International Rice Research Institute (IRRI) in the Philippines demanded its abolition. The IRRI rice development model, launched in the mid-1960s, had been manufactured under the supervision and control of the Rockefeller and Ford Foundations. The model was primarily designed to provide enhanced business opportunities for agribusiness. To accomplish this objective it was necessary for the Foundations to take rice research out of the hands of Asians. To a degree, they succeeded.

The attacks on IRRI began in 1982, with the first broadside fired by a top Filipino scientist, Dr Burton Onate. As President of the Philippines Agricultural Economic and Development Association, Dr Onate publicly declared that IRRI-inspired agricultural practices had 'sapped the energy, resources and economic bounties of the Philippines.' Filipino farmers and peasants joined

the anti-IRRI lobby in 1985. In a series of meetings held from May to July that year, major farmers' organizations focused on how IRRI technology had driven farmers into debt. The language used by these organizations against IRRI was as colourful as it was instructive. A meeting of farmers from the Visayas region, for instance, stated simply: 'Abolish IRRI, and conduct all subsequent farm research in the fields, among farmers.' A conference of farmers from Mindanao recommended: 'Put up a counterpart to IRRI which shall be managed by Filipinos.'

The most comprehensive and articulate offensive came from Dr Onate. The target of the critique, according to Onate, was IRRI seeds, which he said should be called 'seeds of sabotage', for they 'threaten to keep Filipino farmers in bondage for ever, have wrought havoc on the rice industry and the economy, alienated, destroyed and polluted Philippine soils and environment' and 'incurred costs in human health and limb.'[25] These unwanted developments, noted Onate, were adequate justification for terminating the 1959 agreement between IRRI and the Philippines government.

Onate dismissed the IRRI package of green revolution inputs as 'Mercedes-Benz or Cadillac' technology, with its demands for expensive equipment like tractors, large scale dams, imported fertilizers and dangerous, costly pesticides. The presence of IRRI in the Philippines, he asserted, had not helped the Filipinos. Rice productivity in the Philippines remains one of the lowest in southeast Asia, and the Philippines once again began to import rice in 1984 and 1985.

Do the farmers and scientists have political backing? In November 1984, the then Batasang Pambansa (Philippines Parliament) Committee on Agriculture passed Resolution 221 questioning the relevance of IRRI to the country. In addition, the Farmers Assistance Board, the National Farmers Organization (KMP) and the other groups that attended the Bigas conference have begun to exchange old seed among themselves. Farmers from Luzon, the main area of the green revolution where old seed has completely disappeared, are now getting old seed from farmers in the uplands and elsewhere. Whether IRRI shuts down or not, a large number of farmers have already decided to ignore it. Soon we may have the paradox of IRRI seeds being least used in the country in which the Institute is located.

The Dams

In 1979, when the World Order Models Project (WOMP) issued its now famous statement on the 'Perversion of Science and Technology', it did not include the case of large dams or discuss how this form of large-scale water management led to the immiserization of millions of tribals and defenceless villages in various parts of the South.[26] Both popular and scholarly opinion viewed large dams as being largely beneficial. The last decade, however, has seen a sea change in attitudes. Popular opposition to dams has led to movements that have successfully stalled projects and have inspired an international coalition against such development.

A definitive work on the social and environmental effects of large dams provides most of the data required 'to damn the dams'.[27] In practically every case, environmentalists have questioned the need for dams because of the latter's negative ecological consequences, and citizens' groups have defended the tribal populations' right not to be displaced by such projects. The notion that a dam is an unquestioned public benefit has been delegitimized and development delivered another blow. The fact that tribal populations, usually considered fragile peripheral minorities, could stall massive development projects, is ample proof that development is a paper tiger.

In India, opposition has developed towards a number of major dams. One prominent case is of the Tehri Dam, a couple of kilometres downstream from the confluence of two Himalayan rivers, the Bhagirathi and the Bhilangana. The proposed rock-filled dam, 260 metres high (the fifth highest of its kind in the world), is designed to irrigate 668,000 hectares of land and generate hydroelectric power (installed capacity 2000 MW).[28] A Tehri Bundh Virodhi Sangharsh Samiti set up in 1978 has continued to campaign against the dam with two major arguments: one, that the dam and its location could trigger an earthquake; two, that the dam would rapidly silt up in the Himalaya. The Samiti stated that 70,000 people would be displaced by the dam, and that the entire town of Tehri itself would have to be relocated at a higher level. A writ petition filed by the Samiti was recently dismissed by the Supreme Court.

The other major dams against which massive opposition is developing in India include the Sardar Sarovar and the Indira

Sagar to be constructed as part of the Narmada Valley Development Project. The environmental losses which the erection of the Narmada project would involve are now reckoned by the Government of India's own Department of Environment to exceed several times over (in cash value) what the dams will generate in terms of power and increased agricultural production through irrigation. The human costs, in terms of more than a million people, mostly tribals, who will be displaced, are so formidable that it is doubtful whether any government could successfully manage them.[29]

Not for nothing have the Narmada dams become the focus of a major development war. On 28 September 1989, a massive rally of more than 60,000 people, including tribals, at Harsud (a town to be completely submerged by one of the large dams) served notice of their intention to block the construction of the dam. On 25 December 1990, anti-dam protesters commenced a Long March to the Sardar Sarovar dam site to force the work there to stop.

The Chico Dam, to be built on the Chico River in the Philippines, has also been stalled.[30] The catchment area is the home of two major tribal peoples, the Bontok and the Kalinga, 140,000 in number. The first reconnaissance teams entering the proposed dam sites in 1975 were met by tribal petitions and protests and had to be protected by the Philippine constabulary. Soon, PANAMIN, the official tribal protection agency, entered the scene, only to worsen matters. It offered gifts, money, and scholarships to tribal leaders opposing the project. PANAMIN was forced to withdraw from the area in disgrace. The 60th Philippine constabulary battalion which replaced it was also compelled to retreat.

The Chico Dam soon became an international issue. The discontent enabled the New People's Army to enter the fray. The resulting conflict between the Army, the NPA and the disturbed tribes generated mass detentions, aerial bombings, indiscriminate shellings and retaliatory action. By 1980 over 100 people were already dead. Development is after all warfare. In fact, the disruption of tribal life has been enormous and the Kalinga region resembles a major war zone. However, no dam has been constructed along the Chico.

The construction of the Nam Choan Dam in Thailand has also been stalled.[31] The campaign to stop this dam was skilfully organized by students from several educational institutions and led

by Mahrdol University. The protests were successful despite the fact that the National Social and Economic Development Board of Thailand had endorsed the project and the World Bank had approved the loan for its construction. The campaign, which included an open letter from the students to the World Bank President, involved a range of people from environmentalists, archaeologists, lawyers and journalists to the Kanchanabuni and Samati Songkram people.

The stalling of a major dam on the Franklin river in the southern island state of Tasmania became a major issue at by-elections and later at the federal elections. The anti-dam campaign supported the Labour Party against the Liberal government, as the former had promised to stop the dam if elected. The Liberal government lost the elections.[32]

Another Indian dam project abandoned due to public opposition is the Bedthi Hydel Project.[33] The campaign was organized by local farmers of the Totgars Society who have over the years developed and maintained a highly productive agro-economy in the region. The Totgars organized a seminar in which ecologists and economists analysed the cost–benefit ratios given in official documents concerning the project, and proved that the Planning Commission had been misled in the estimation of the true costs of the dam. Eventually approval for the project was suspended.

Other proposed Indian dams generating considerable resistance among local populations and environmentalists are the Koel Karo, the Sharavati and the Ichampalli-Bhopalpatnam dams, Bodghat, Pooyamkutty and Suvarnarekha.[34] In all these cases, mass movements led by activist groups are seeking a halt to all construction. In all cases thousands of adivasis would be dispossessed of their ancestral homelands and arbitrarily relocated with minimal compensation.

In Malaysia, Sahabat Alam Malaysia (SAM) set in motion a major national campaign to oppose the 2 billion dollar Bakun Dam. *The Saravak Tribune* reported on 5 February 1986 that a group of indigenous people from the upper Rajang Basin have sworn to defend their land from being destroyed by the government project. SAM has raised serious questions about the economic viability of Bakun (which is being considered for funding by the World Bank and the Asian Development Bank). SAM has observed that the project, in displacing 5,000 natives, is designed to benefit MNCs rather than local Malaysians.[35]

India's Anti-Nuclear Movements

Over the past few years, movements in India have begun to protest against that pinnacle of modern science and technology: nuclear power. A number of major popular agitations oppose the situating of reactors in the states of Kerala, Karnataka, Gujarat and Andhra Pradesh. Armed with vital information on reactor safety and potential risks, the protest movements criticize standard lectures on nuclear safety provided by officials. Ordinary people have invaded the esoteric regions of the jealously guarded nuclear world, and attempted to comprehend the technical aspects of nuclear technology and to discourse on them with competence.

Keen to dismiss these 'non-scientists', the experts nevertheless are unable to provide reassuring answers to probing questions. Most disturbing questions center around how these experts have managed the reactors already built; especially after the Chernobyl incident all reassurances on nuclear safety are suspect.

One of the first (and successful) agitations against nuclear energy emerged at Kothamangalam in Kerala.[36] Here, opposition took the form of a registered society, the Organization for Protection from Nuclear Radiation (OPNR), and included the Kerala Shastra Sahitya Parishad. The OPNR published a two volume assessment of the proposed reactor and its impact on human and natural environment. The reactor issue became a focal point in the district during the 1984 elections, and the administration finally shelved all action on it.

At the commencement of the 1990s, the Nuclear Power Corporation was once again suggesting a nuclear reactor complex for Kerala. However, because of feared opposition to its plans, it was unable to disclose new possible sites.

In Karnataka, where the Department of Atomic Energy plans to establish six 235 MW reactors at Kaiga, local environmentalists have been demanding that the project be scrapped.[37] They have been joined by protests from the neighbouring state of Goa which would have to be evacuated in case of an accident at the proposed Kaiga site. Countless discussions on the hazards of nuclear technology have been held with the participation of villagers. The opposition has disturbed the Department of Atomic Energy sufficiently for it to field its seniormost administrators, R. Ramanna and M. R. Srinivasan, to meet the protesters and help clear their

doubts. The people have remained sceptical, since the DAE refuses to reveal the record of its handling of other Indian nuclear plants, including Tarapur, rated the world's most polluted reactor unit.

A principal reason for opposition to the Kaiga plant is its potential impact on the area's dense and natural forests, one of the few such remaining areas in India. The plant site is also below a series of major dams, one of them located on a seismic fault. Significantly, one of the leaders of the opposition to the reactors is Shivram Karanth, doyen of Kannada literature.

Another anti-nuclear movement has emerged against the proposed Kakrapar project in Gujarat,[38] where, despite police bans, a 5,000-strong crowd, mostly tribal, attempted to attend a meeting to register their protest against the siting of the plant. Leading the agitation was the Institute for Total Revolution from Surat. A former Chief Minister, Babubhai Patel, now regrets his role in asking the Central Government for the nuclear plant when he led the State.

Five-Star Tourism Development

I will end with a brief account of a recent inconclusive battle against five star tourism development in the tiny state of Goa. Blessed with a scenic beauty quite distinct from the rest of India, Goa was recently 'chosen' as the latest tourist destination for Euro-Americans disinclined to visit either Sri Lanka or African states such as Kenya, because of the contamination of the latter through the AIDS virus. The Goan population was obviously not consulted. The decision was made by Delhi.

On 5 June 1987, the local administration disclosed the existence of a Master Plan for tourism development in the state. The Master Plan symbolized the new direction in which the local economy was sought to be directed: henceforth it would become subject to the extravagant, ecologically devastating demands of luxury tourism. Unfortunately for the Master Planners, Goa has a highly literate community. Within weeks, aware of what had happened to Hawaii and other tourist spots in the South, local citizens raised the Jagrut Goencanranchi Fauj (Vigilant Goans' Army) to subvert the plan.[39] The local administration relented as opposition to the proposed development grew, and delayed the finalization of the Plan by

appointing an Expert Committee which took months to deliberate. Later, the Plan was dropped.

In the meanwhile, the Fauj has begun to recruit more 'soldiers', organize exhibitions, protests and marches, and has generally succeeded in keeping the administration (including the Central Government) on the defensive. Should the Fauj eventually succeed in its objectives, another major destructive assault on the South's environment will be effectively countered.

Anti-Development Thinkers

A history of anti-development wars must include a history of anti-development ideas. A number of outstanding people have made significant intellectual contributions to this history. The most important and also the most far seeing of these was Mohandas Karamchand Gandhi.

Since 'development' is an unquestioned pillar of faith with practically all ideologies, one expects these ideologies to exhibit a common hostility to 'anti-development' thinkers. This is clearly demonstrated in Gandhi's case. His opponents have included Communists, revolutionaries, Marxists, Naxalites, liberals, Trotskyites and modernizers. The routine antipathy of such a varied group of people only indicates their shared assumptions concerning development.

Gandhi's epochal anti-development work, *Hind Swaraj* (1909),[40] is a stinging critique of modern civilization and technology. Gandhi understood instinctively the self-destructive nature of industrialism, its pronounced anti-human character, and the direction in which it was headed. For these reasons, he concluded that it could never enhance life. In making the choice between machines and people, he at least invariably rooted for people.

In *Hind Swaraj* Gandhi anticipates Lewis Mumford, one of the most prophetic figures of western civilization, by more than two decades. The tract's significance (as with Mumford's writing) remains undiluted even today. In it, the myth of the machine lies totally exposed, the pentagon of power rudely abused. 'All that comes from the West on this subject,' wrote Gandhi, 'comes tarred with the brush of violence. I object to it because I have seen the wreckage that lies at the end of this road. The more thinking set even in the West today stand aghast at the abyss for which their system is heading.'[41]

T. K. Mahadevan notes in his book, *Dwija*, that in dwelling on the post-*Hind Swaraj* Gandhi, people overlook the fact that he was more concerned with the enslavement of people's minds rather than with the tyranny of an empire: 'There was a tug-of-war going on in his mind—with India pulling him towards her on one side and the impending crisis of modern civilization beckoning him on the other—and that, as a practical idealist (or, let us say, as simply an astute politician) he found the pull from his native land more difficult to resist, besides being immediately practicable. On the other hand, there is not the slightest doubt that the concern nearest his heart was not India's freedom from British rule—or any rule for that matter—but the liberation of man from the horrors of a mechanistic, insensate, acquisitive and non-humanistic civilization.'[42]

Modern civilization, observed Gandhi, oppresses not only us but the British! East and West can really meet only when the West has overthrown modern civilization in its entirety. The same applies to India. Unless we rid ourselves of our fascination with such a civilization, we will continue to be enslaved, within or without the British Empire. 'If British rule were replaced tomorrow by Indian rule based on modern methods, India would be no better. Indians would then become only a second or fifth edition of Europe and America!'[43]

Hind Swaraj was immediately banned when it was published in 1909: Romain Rolland, for instance, rightly saw that it was a document that attacked the western notion of progress (or development) and of European science. In a recent essay, Partha Chatterjee has shown that the tract should be seen as a radical critique of bourgeois civil society and its institutions with which Indian civilization had little in common and which eventually became the inspiration of 'development'.[44] According to him, Gandhi's condemnation of the paraphernalia of modern civilization was 'a fundamental critique of the entire edifice of bourgeois society: its continually expanding and prosperous economic life based on individual property; the social division of labour and the impersonal laws of the market described with clinical precision and complete moral approbation by Mandeville and Smith; its political institutions based on a dual notion of sovereignty in which the people in theory rule themselves but are only allowed to do so through the medium of their representatives whose actions have to be ratified only once in so many years; its spirit of innovation,

adventure and scientific progress; its rationalization of philosophy and ethics and secularization of art and education.'[45]

If development implies the transplantation of the institutions and goals of bourgeois civil society from the industrial countries into the South, here is a thoroughgoing rejection of such a proposal. In this sense, Gandhi remained an indigene *par excellence*, seldom apologetic for the positions he held. He had concluded that modern civilization, its form of organization and its driving forces, only increase human suffering. In this, noting the intimate connection between desire and suffering, he was repeating what Gautama Buddha had said a few centuries earlier. He attacked the lucrative western professions of doctors and lawyers, called Parliament a 'prostitute', and warned against the system of western education and its sterile implications. Like Mao Zedong, Gandhi saw that development and culture cancel each other: the success of development lay in extinguishing cultural identities. Once that had happened, what was the point of the exercise?

It is not surprising, therefore, to discover that a stream of Indian leaders, from Gokhale to Nehru, criticised either *Hind Swaraj* or Gandhi's constructive programme. The differences between Nehru and Gandhi were first put on record in 1928, when Nehru wrote to Gandhi:

> You know how intensely I have admired you and believed in you as a leader who can lead this country to victory and freedom. I have done so in spite of the fact that I hardly agreed with anything that some of your previous publications—*Hind Swaraj*, etc.—contained.
>
> ...You misjudge greatly I think the civilization of the West and attach too great an importance to its many failings. You have stated somewhere that India has nothing to learn from the West and that she has reached a pinnacle of wisdom in the past. I entirely disagree with this viewpoint.... I think the Western or rather industrial civilization is bound to conquer India, may be with many changes and adaptations, but nonetheless in the main based on industrialism. You have criticised strongly the many obvious defects of industrialism and hardly paid any attention to its merits.[46]

Gandhi wrote in reply:

> Though I was beginning to detect some differences in viewpoint between you and me, I had no notion whatsoever of the terrible extent of these differences.... I see quite clearly that you must carry on open warfare against me and my views. For, if I am wrong, I am evidently doing irreparable harm to the country and it is your duty after having known it to rise in revolt against me.... The differences between you and me appear to

> me to be so vast and radical that there seems to be no meeting grounds between us.... Write to me a letter for publication sharing your differences. I will print it in *Young India* and write a brief reply.... And if you do not want to take the trouble of writing another letter, I am prepared to publish the letter that is before me. I consider it a frank and honest document.[47]

Nehru proved disinclined to publicize the differences. It was thus only in 1940 that Gandhi made the first public acknowledgement of the difference, when he wrote: 'Pandit Nehru wants industrialization, because he thinks that if it is socialized, it would be free from the evils of capitalism. My own view is that the evils are inherent in industrialism and no amount of socialization can eradicate them.'[48] The differences would finally crystallize in a fresh exchange of letters in 1945.

Here we have the outlines of the Great Debate of our times, with Gandhi in one camp, and Nehru and the ideological critics of Gandhi on the other. The debate is about development, nation-building, progress. It is not that the two camps propose alternative methods towards these goals, the road Nehru took the nation on after 1947, and the one Gandhi had proposed. There were two different sets of ideas of what should be the object of man, of human activity, values, and society. The war had its origins here. Today, true to expectations, both liberal capitalism and socialism are in a severe crisis. Liberal democracy seems to have reached its outer limits. And whenever it does, it reveals its anti-people character.

In addition, both socialism and capitalism are subject to the law of diminishing returns. Both are predicated on the view that man is dissociated from nature, and is therefore free to exploit it for unlimited human gains. Gandhi's simple dictum provides a radically divergent view: 'There is enough,' he wrote, 'for everyone's need, but not enough for even one man's greed.'

'Let us not be obsessed,' he said, 'with catchwords and seductive slogans imported from the West. Have we not our own distinctive eastern traditions?' For himself he was ready to acknowledge that whatever he felt he had done for the country was due to the retention of elements of eastern culture in his soul. 'I should have been thoroughly useless to the masses as an anglicized, denationalized being, knowing little of, caring less for, and perhaps even despising their wits, habits, thoughts and aspirations.'[49]

It is important to recall this frank admission, especially within the context of the 'development world' and its preoccupations today, when those committed to development, either pro- or anti-establishment, feel that the oppressed classes cannot be liberated except through science, education, INSAT, word processors, Marxist-Leninist ideas, or guns. Mahatma Gandhi rooted instead for the charkha, an anti-machine tool, and made it the symbol of national liberation. He also tapped traditional feelings of dignity and self-respect, welded them together with elements of Indian tradition and created thereby a weapon that the world had eventually to honour.

Besides Gandhi, another major critique of modern civilization and its assets has been the late Lewis Mumford's. Mumford broached similar themes in his books in the 1940s, decades before the crisis of the commons was hysterically announced by Garrett Hardin in his controversial essay in 1968. In the *Condition of Man* (1944) Mumford saw the arrival of a new civilization in 'dynamic equilibrium'. Later, in *The Myth of the Machine*, he admitted his mistaken optimism. In a classic essay, he confessed that had he known of the impending menace of the megamachine in all its forms, he might at birth have turned back into his mother's womb.[50]

Which brings us to Illich, who readily acknowledges his debt to both Gandhi and Mumford. Illich came first to notoriety with *Deschooling Society*, which seemed at first glance to be a major attack on the school, a premier institution of modern development.[51]

However, it was soon clear that *Deschooling* was not so much about schooling as it was a more general diagnosis of industrial civilization and its counter-human proclivities, to which Illich later added *Energy and Equity, Tools for Conviviality,* and *Medical Nemesis*.[52]

Deschooling Society arrived during the period when intense concern was being expressed about the limits to growth. Illich argued that the service projects of the Welfare State inevitably led to destructive side effects, comparable to the unwanted side effects resulting from the overproduction of goods. Therefore, limits to care were needed as a necessary complement to limits on goods. If overproduction of education militated against learning, the institutionalization of medicine obstructed health care and brought about iatrogenic illness, while the organization of transport led to

people becoming less mobile. These were startling, paradoxical counter productivities.

In his more recent *Shadow Work*, Illich re-interprets his work as the 'study of scarcity'. He notes that the assumption of scarcity is fundamental to modern economies and that formal economics is the study of value under this assumption. Economic development is the gradual usurpation by the formal economy of what was once available to all as a common resource, and its control by the powerful or the State. Thus subsistence (the use of which is not scarce) pits itself against development.

In the 'War Against Subsistence', an essay on 'everyday speech', Illich focuses on an early sixteenth-century individual, Nebrija, who suggested to Queen Isabella how she might bring 'order' to her realm (even while Columbus was conquering fresh lands overseas). Nebrija proposed to accomplish his project by imposing a grammar on the untutored language of the masses.[53] In his attempt to justify the suppression of untutored speech at home, Nebrija expressed anxiety that 'the unbound and ungoverned speech in which people actually live and manage their lives has become a challenge to the Crown.'[54] For the first time, an unproblematic human feature was interpreted as a problem for the architects of a new kind of polity—the modern state.

As a result of Nebrija's heritage, says Illich, we today consider people as creatures who need to be taught to speak correctly to communicate in the modern world—as they need to be wheeled about in motorized carriages to move in modern landscapes. Dependence on a taught mother tongue is the paradigm of all other dependencies typical of humans in an age of commodity-defined needs. 'The radical change from the vernacular to taught language (taught mother tongue) foreshadows the switch from breast to bottle, from subsistence to welfare, from production for use to production for market'.[55] Formerly there was no salvation outside the Church. Now there would be no reading, no writing—if possible no speaking—outside educational or bureaucratic control. Both the citizen of the modern state, and his state-provided language are novelties—'both are without precedent anywhere in history.'[56]

In a related essay, Illich reviews how the industrial system laid its foundations, and proceeded to expand its boundaries. Before the enclosure movement intensified, the structural design of medieval

society was such that it excluded unemployment and destitution. Wage labour at the time was a badge of misery—in clear contrast to the household economy, to beggary (morally legitimate), and to the income from trade. In fact, the need to provide for the necessities of life by wage work was considered a matter for pity in an age when poverty designated a valued rather than an undesirable economic condition. Enclosures changed that. As the movement for enclosures put the majority out of subsistence in the seventeenth and eighteenth centuries, wages gradually became a sign of usefulness. It was the beggars' turn to become a problem. They were thrown into beggars' homes where they were softened up for factory life by being subjected to starvation and a carefully planned ration of daily lashes.

The peasants did not take this lying down. The enclosures of common land, and later of beggars into beggars' homes, was the cause of much rioting and might even have succeeded in 'turning the world upside down'.[57] A new social device saved the day. Where the enclosure of beggars in factories, and sheep in enclosures, had almost failed, success came, Illich argues, with the enclosure of women, or their domestication. Working men were turned into the wardens of their wives: 'Man and woman both effectively estranged from subsistence activities became the motive for the other's exploitation for the profit of the employer and investments in capital goods.'[58]

Illich can be terrifying about this:

> Anyone who sees the *zek* in the gulag primarily as a slave is blind to the motto that only a Hitler presumed to write large on the entrance to Auschwitz: *Arbeit macht frei* (Labour gives freedom). He will never understand a society in which the unpaid work of the Jew in the camp is exacted from him as his due contribution to his own extinction. Prose cannot do justice to a social organization set up to enlist people in their own destruction.[59]

The only statement Illich is willing to make concerning the future is that economic shrinkage may allow vernacular values to return. By 'vernacular' he means the language acquired with unpaid teachers, and by vernacular work, unpaid activities that provide and improve livelihood but are opposed to any analysis that relies on concepts developed in formal economics—autonomous, non-market related actions through which people satisfy everyday needs—which by their nature escape bureaucratic control

or can be defended 'from measurement or manipulation by Chicago Boys or Socialist Commissars'.[60] A desirable future society may find that its health lies in expanding such a mode of doing and being.

It is interesting to see the transformations the image of man has undergone in the West. Once, western anthropologists labelled non-western societies primitive or savage. Later, they called them backward, traditional, static, underdeveloped and in need of help to 'take-off'. There was talk of dual economies, of how to bring formality to the informal sector, and we heard of barefoot doctors and barefoot managers. Today, that position has been reversed. For people like Ivan Illich subsistence man is (once again) a much preferred ideal type, possessed of virtues that seem sadly lacking in the moderns. The emperor has once again lost his clothes. Civilizations apparently move not in cycles, but in circles.

Illich's critique of the industrial society is articulated from within the western tradition. Though he talks of subsistence culture and vernacular values, his only guide is western (medieval) history. The appeal to medieval subsistence is not new. Mumford, whose influence Illich readily acknowledges, had done considerable scholarly writing on similar themes.

In *The Unintended City*, written in an earlier decade, the Calcutta architect Jai Sen provided equally striking categories of analysis.[61] He indicated that the typical boundaries of 'urban and rural' break down in the reality of today's cities, that subsistence culture has extended its reach into the city and transformed it. For most people in such social situations, subsistence forms the base, while wage labour is supplementary. The Biharis who labour as rickshaw-pullers in Calcutta are subsistence farmers, who will not give up their village roots and the autonomy that this grants.[62] It is the same factor that enabled the textile workers of Bombay to prolong their epochal strike for nearly two years: a large number of workers returned to their villages to sit the period out. Subsistence remains the key.

Four other major anti-development thinkers need to be introduced here: Masanobu Fukuoka, Manu Kothari and Lopa Mehta, and Gustavo Esteva.[63]

In 1978, Fukuoka, a Japanese agricultural scientist, published a book called *The One Straw Revolution*.[64] Ostensibly a tract on agriculture, it exposed in fact the hollowness of modern civili-

zation. If Fukuoka had had only the limited object of rendering modern agricultural science (one of the major pillars of modern development), the laughing stock of the age, he could not have been more devastating. His tract, however, was not about alternative agriculture, nor was it a reaction against western agricultural science. These things followed, as he set out to discover over a period of forty years what he calls 'the centre of things'.

Fukuoka called his method of farming 'do-nothing' agriculture.[65] He assumed that since nature is the most experienced farmer among us, it makes better sense to closely replicate natural principles than to make substitutes for them with our limited understanding, and thus do with great difficulty what nature does with ease. Without using any of the modern paraphernalia considered necessary for a productive agriculture, Fukuoka achieved similar if not better results in his fields. Fukuoka related modern civilization's drive for development to other aspects of the same civilization, and basing himself on the values of Zen Buddhism (of which one rarely hears anything in development literature) questioned the necessity of economic development and progress.

To the question, 'If you did nothing at all, the world could not keep running: what would the world be without development?' he replied:

> Why do you have to develop? If economic growth rises from 5 per cent to 10 per cent, is happiness going to double? What's wrong with a growth rate of 0 per cent? Isn't this a rather stable kind of economics? Could there be anything better than living simply and taking it easy?[66]

How did we get embroiled in development? Writes Fukuoka,

> The farmers became too busy, when people began to investigate the world and decided that it would be 'good' if they did this or that. The more people do, the more society develops, the more problems arise. The increasing desolation of nature, the exhaustion of resources, the uneasiness and disintegration of the human spirit, all have been brought about by humanity trying to accomplish something. Originally, there was no reason to progress, and nothing that had to be done. We have come to the point at which there is no recourse other than to bring about a 'movement' not to bring about anything.[67]

Fukuoka's attack on development, based on his system of natural farming and do-nothing agriculture, parallels the naturalistic theory of disease and do-nothing medicine propounded by Manu Kothari and Lopa Mehta in their book, *The Nature of*

Cancer (1973), and in their more recent *Death*.[68] These two professors of medicine ridicule a great portion of the corpus of western medical science, and demonstrate the futility of curing so-called life-threatening diseases, including cancer, diabetes and hypertension. They propose that these biological diseases do not have any 'cause' or 'cure', and that the physician's task should be limited to doing no more than what the origin of the term *curare* suggests, i.e., to care.

Against the arbitrary cause and effect theories proposed by modern medical science, they propose a new theory of disease in which the cause lies in what they call 'herdity'—a function of the herd we belong to.

The sheer fact that we happen to be human beings makes us part and parcel of the programme the herd is subject to. A society, by its corporate genotype, owns and produces a birth defect, a stroke or a cancer and distributes it to individuals at random, on an impartial and probabilistic basis.

Further, they state, 'Out of every five people in the world, one must develop cancer: this is certain. Which one of the five will get it is uncertain and follows the law of probability.' Herdity is impartial about distributing it amongst the rich and the poor, whether they have access to the most modern medical treatment or not.

Kothari and Mehta write,

> The corollaries to what we have said are concise and clear: one man's cancer is another four men's freedom from it; my severe diabetes is because of your milder or no diabetes; one child's cleft-palate allows another 1,000 children to escape it; one person's acute lymphoblastic leukemia ensures that 32,999 persons are free from it. Thus the top brass in the level of I Q and creativity owe a normal debt to the bottom levels. Every healthy, disease-free individual carries with him an I O U card addressed to another individual not so privileged.
>
> This is what we mean by the democracy of disease. Whether it is cancer or diabetes or heart attack and death, nature has to go by numbers. I had a brother who died at the age of 29 of a heart attack. And I realize that because he died of heart attack at 29, he allowed me to be privileged to live till the age of 48 or 60. A time must come when we should realize that any natural disease is not an individual fault, or the result of an act of commission or omission. It is an expression of social duty at an individual level, involuntarily accepted, for who likes an onerous duty like cancer anyway. No man is an island, and everyman's cancer is mine.[69]

The theory of 'herdity' strikes at the root of a developmental

approach to disease in which greater knowledge, sophisticated equipment, and research, promise major improvements in eradication of illnesses or their cure. There is little basis for such political promises; but they help generate huge funds for research and development and keep many employed.

Kothari and Mehta therefore advocate an anti-development approach in the treatment of these major diseases. They suggest that radical interventionist therapies merely serve to further destabilize the patient and increase his chances of mortality. Their meaningful theory of disease and death not only bypasses the banal causality of modern science, and development based on it, but also presents a socially attractive and responsible form of disease management.

The fourth individual included here is the Gustavo Esteva whose seminal essay, 'Regenerating People's Space', has been frequently quoted in this work. He confesses to a double perception of the human world. The first, he says, he acquired through his formal education and training as a professional. The second grew in him while in the company of his grandmother, as he observed her interaction with the people of her world. Esteva soon realized that the two perceptions are separate realities.

In his article, he describes the varied contours of his personal odyssey, the transition from one perception to the other, and the corresponding de-professionalization this demanded. He now accepts the 'dissolution of universal values', and distrusts the vocabulary of development, for he must first discover whether 'those words taught to us are truly ours.' The rejection of western values, of development and its cosmology, is uncompromising and complete.

Significantly, a Japanese rice specialist, two professors of medicine in Bombay, a social historian investigating the western medieval ages, and a de-professionalized Mexican, independent of each other, and within the same decade, conclude that development is dead, that it is as partial to western interests as the Second Law of Thermodynamics, and that it is integral to a flawed approach to life whose universal application only provides the breeding ground for more intractable problems.

6
Summing Up

The first question to be asked after the preceding discussions is, what is the alternative? The question is usually raised by those who have accepted development as an inevitable process designed by policy makers for the public good, invented by specialists and experts to make the poor affluent. What indeed is the alternative? Can we, as is so often asked in dismay, 'go back to the past', to the medieval period, to tribalism, to the bullock cart era?

If we freeze development, do we not indeed condemn millions of people forever to a miserable life, despicable living standards, and thereby help preserve a status quo grossly inequitous and unjust? Was this not the precise message of the numerous criticisms of the 'Limits to Growth' report, and the proposals in Jonathan Schnell's *Abolition*?[1]

On the other hand, we have seen how development is an establishment-sponsored project, based on plunder and inevitably leading to triage, wedded to double-speak. It is designed to condemn increasing millions to a life of abject deprivation, and help deepen the gap between rich and poor. This has been the lesson of nearly four decades of development initiatives and programmes.

Development appears to have high-sounding social objectives, which are mere rhetoric, for its actual processes are operated, at the planning and execution stage, at the production and consumption end, without democratic participation. The only class benefiting from development is the one which has increased its access to and control over the natural and human resources of the planet via the development process. For this global ruling mob, development is an inexhaustible source of enhanced privilege and power. It is appropriate to reiterate here what was stated in *Homo Faber* way back in 1979: 'The extension of the personality of the

west to the non-western world can be directly correlated with an increase in the sum total of poverty, pain, and destruction in that part of the globe. We are gradually reaching the stage when it will be possible to proclaim the arrival of a new principle: "the greatest unhappiness of the greatest possible number".'[2]

The search for an 'alternative' is more complex than would seem at first sight. In fact, the very question, 'What is the alternative?' will be seen to be an inappropriate response, particularly if one has digested the main arguments of this book.[3] The discussion on alternatives is further vitiated by the fact that most alternatives proposed are predominantly technological. This is perhaps because they are easy to propose, and do not involve a radical altering of the ownership of assets or resources, or their redistribution. Rarely are alternatives sought in the direction of radical democracy or decentralist politics.

Further, discussions about alternatives tend to remain speculative and meaningless if they do not proceed from the fact that practically all non-western human experience, in so far as it has not yet been flattened out or degraded by the western personality, is an existing, and therefore, a continuing, viable, 'alternative'. But the term is still dangerous. What we seek to elaborate here should not be seen in terms of an 'alternative' to the established development ideology, but as an introduction to an evaluation of lifestyles, preoccupations, social ideals that diverge from it or remain uninfected by it. Ashis Nandy's statement: 'India is not non-West, it is India', is an apt formulation.[4] The West may need alternatives. The non-West, the plural non-West, may need to look for something else. This something else would be post-modern, post-traditional, but non-western.

I have rooted my discussion of development, science and violence, in two dichotomies: the first of these, the natural versus the scientific; the second, subsistence versus development. In past decades, nature and subsistence (they overlap as images) were seen as 'primitive', lacking the superior imprint of modern science, of modernity. The latter set, modern science and development, became the norm. This, we have seen, has produced unacceptable *himsa* for a number of reasons.

In human history, however, even the history of ideas, one should expect that what goes up always comes down. A number of thinkers are already predicting the eclipse of Galilean (modern)

science in principle, and in practice. The major part of Fritjof Capra's *Turning Point* (which we examine below) is devoted to documenting the decline of reductionist, mechanistic science.[5]

In conclusion, development, not subsistence, is abnormal. Development is diseased subsistence. Similarly, we propose that Galilean science is a distortion of what we call civilizational science. Both these positions have been taken in this study which ends with a few final considerations to tie up the arguments.

Development, Subsistence and Ahimsa

A wealth of studies and interpretations by western scholars of subsistence culture have not, for some reason, penetrated the mainstream consciousness of our age. These studies try to prove that subsistence is marked by qualities and values associated with *ahimsa*, and is of great significance for present-day industrial societies. Successful development is often correlated with providing enhanced leisure availability or good nutrition, but primitive cultures already seem superior in these respects.

The anthropologist Sahlins spoke of the original affluent society, and Robert Clarke and Geoffrey Hindley have written a reflective account in the *Challenge of the Primitives*.[6] Some of these themes have also been studied by Stephen Marglin in his essay, 'To Gain the Whole World'.[7] The ecological bases and demands of both subsistence and development have been studied by Richard Wilkinson in *Poverty and Progress*, and by others. (The discussion has been paraphrased in my *Homo Faber*).[8] An excellent recent presentation of similar themes has been made by Keith Buchanan.[9]

An illuminating fable about the attitudes of subsistence folk to the so-called benefits of economic growth is commonly related at development conferences. In the story, a development expert encounters a peasant dozing under a coconut tree, and asks him what he is doing. The peasant sleepily replies that he is waiting for the coconuts to fall so that he can sell them for his livelihood. The expert advises the peasant that he could make more money if he improved his productivity, and chased the coconuts instead of waiting for them to fall. With the increased returns, the peasant would become a rich man, and then have others do the job of climbing trees, so that he could then lead a life of leisure, and spend a good amount of time sleeping under coconut trees.

I do not wish to romanticize subsistence (though numerous journals and papers constantly romanticize the great adventure of development), but I believe that the kind of hard subsistence encountered today is the *consequence* of development and brute oppression. Clarke and Hindley give an example:

> Not so long ago there was a tribe living in New Guinea, good farmers and brave warriors, who over countless generations had evolved a pattern of life perfectly adapted to their social needs and to the landscape in which they lived. They are no longer there. An international mining corporation discovered rich mineral deposits under their territory and armed with 'authorization' and bulldozers easily ploughed down the villages and cleared the land. The warriors now pass their days spending money provided by the company in the beer halls provided by the company, and their nights in the prefabricated dwellings built by the company. After thousands of years of being people, the tribesmen are now a social problem—their land stolen, their culture destroyed and their self-respect sacrificed to western man's insatiable demand for raw materials.[10]

Adaptation, harmony, *ahimsa*—these are by and large qualities not merely of tribal cultures, but of settled non-western populations prior to the interventions of the industrial project. Buchanan talks of their 'cultures of totality'. It is the North's societies which are deviants—not only are they disharmonic, produce extravagant waste, demand enormous resources, but they require the permanent victimhood of millions in other societies. If subsistence is the normal cell, development should be seen as normal cells turning cancerous. Eventually, the cancer destabilizes the entire human system, just as development undermines the global environment. The depletion of the ozone layer and global warming are two good examples.

Charges that halting development and reversing direction is tantamount to 'going back to the past' miss the point. A person who wishes to control his obesity is not 'going back', but is eager to return to a state of homeostatic balance from which he had departed earlier. (Westerners devote a great deal of time and money to returning their bodies to such a homeostatic balance, but are unable to see how similar principles ought to be made applicable also to their economies).

No other demand need be made of the mal-developed countries except that they return to a sustainable relationship with the environment, and diminish their present predatory relationship not only with their own environment, but with that of others as well. If

this is not an unreasonable demand, one is enabled to argue next for a reverse transfer of learning, from subsistence to development, from harmonised ecologically stable communities to ecologically disrupting societies. The tribal, 'the non-player', do not need alternatives—as Buchanan puts it, they are totalities, despite the fact that they face increasing disruption due to a destructive development. The latter, because it is led by uni-dimensional ideas like productivity, profit, market—is blind to such richness.

This one-dimensionality produces its own resultant pathology. Writes Marglin:

> Hand in hand with the material prosperity of the developed West has gone a very real poverty in other dimensions. Commodities have to play a disproportionate part in our life simply to fill these gaps, to compensate for the spiritual and emotional emptiness of our lives. It is now a commonplace that an automobile, for example, provides not only transportation, but power, identity, and meaning—the power, identity and meaning that are all too frequently lacking in the workplace, in the community and even in the home.[11]

Counterpose the pervasive poverty that Marglin draws attention to with what obtains even today with the 'cultures of totality'. India is a good illustration. It is considered underdeveloped solely because it has not undergone an extensive industrial transformation based on fossil fuels. However, the Indian arts of dance, instrumental and vocal music, are, for want of a better world, 'developed'. So is Indian nutrition science when compared with American or European science. In the past, India had a reasonably adequate decentralized political economy, and one of the most remarkable textile industries of the globe. Yet, the lack of material goods today is enough to condemn the country and its entire historical past to 'underdeveloped' status.

Are we then arguing in favour of maintaining the *status quo* for these 'traumatized' societies of the South? That is impossible, since the principle exemplar of subsistence, nature, is never static but is always adapting and creative. Civilizations like those of India, China, Sri Lanka, Thailand, or Korea have long had expertise in fabricating artefacts, and in constructing elaborate hydraulic works. They have maintained agricultural systems that have successfully managed the problem of fertility over centuries, conserved genetic resources adapted to their environments, and evolved political and community instruments for enabling direct

political participation and decision making. These were more complex than the parliamentary systems they have now been saddled with.[12]

Wherever development or the forces behind the expansion of modern technology have been checked or have shrunk on their own, the people's domain has forthwith expanded and reoccupied the evacuated space. The energies of the unprivileged have once again created appropriate wealth and stimulated welfare. Gustavo Esteva argues that the task of the de-professionalized intellectual whose eyes are open to the development fraud, is to help 'regenerate the people's space', strengthening the politics that enables it to be further legitimized and to expand. The actions he and his colleagues are involved in, he tells us, seek, among other things, to 'dissolve the State and market institutions, specifically their centralism'. This, he says later, is because both state and market institutions 'set limits to our lives and projects.'[13]

I should add here that in the resurgence that would result from these changed circumstances, economic poverty would be the first casualty. In fact, the mechanisms that have continued to create poverty would be effectively checked. The extensive crisis that the South's economies like those of Mexico etc., face today, argues Esteva, 'is our chance to delink well-being from development'; it provides an opportunity to 'stop or reduce the damage done to [the peasants] by development and then to start the regeneration of their lives and projects.'[14] The claims of the peasantry to recover their 'commons', and to regenerate the physical and cultural spaces which had been damaged but not destroyed by the liberal dream have been a recurring feature in Mexican history.

For the liberals and self-appointed progressives of our time, this proposal holds unimaginable dangers. They fear and instinctively distrust the intimate links that the people's domain retains with tradition which, because of their western education they consider unclean, reactionary, and inappropriate for the twenty-first century.

The view that liberal values are superior, and that all earlier traditions and values must give way to them, is an assumption. That such liberal values have a unique 'humanist' dimension is another major assumption, uncritically advertised. Those who subscribe to these judgements also assume that they are in the vanguard of humanity, that their choices are invariably the right ones, that

others continue to remain in the realm of superstition, ignorance and darkness.

Certain elements of tradition may no longer, it is true, be preferred by those living in the twentieth century, but these choices cannot be made by anyone but the people themselves. Societies may be criticised only if they do not live up to their self-professed ideals, not because they do not conform to the ideals of other societies or those of imported ideologies, however 'advanced' these are said to be. Nor should this be construed as an argument for restoring a 'feudal' culture. It is the ruling mobs of the modern age that have raised their own counterparts within the folk domain—kulaks always willing to perpetrate their own brand of anti-social violence and oppression. Often, the alliance between the technocratic mob and the 'feudal' establishment (a new layer of society established, in India at least, under colonial rule) makes life more burdensome for those living by subsistence.

What, then, is the alternative to development? Esteva proposes 'hospitality'; Illich, 'the people's peace': Gandhi, 'antyodaya and sarvodaya'. Esteva finds it a miracle that the peasants 'could still retain hospitality as a defining trait. They have done so because they know that it is not only a condition for survival, but also the only way to live. Since the complete failure of this monstrous experiment called "development" can now be recognized for what it is, the peasants are determined to regenerate a hospitable world, following their traditional paths which are now enriched by the lights and shadows of modernity. *Homo sapiens* and *homo ludens* are celebrating their awareness of having awakened from the nightmare created by the impossible attempt to establish *homo economicus* on earth.'[15]

I have already introduced the reader to Gandhi's critique of development and bourgeois civil society. Gandhi, however, was not the sole critic of such a form of social organization. The Islamic revolution in Iran generated a similar either/or reaction to the institutions of the West. The conflict here, however, was (and is still) seen in terms of a global polarization between the forces of Islam and those of *kufr*. Thus, writes Kalim Siddiqui,

> The chief vehicles of the pursuit of western interests in the post-colonial era are 'education', 'modernization' and 'development'. The western-educated élite understands all these terms in the meanings given to them by

> the west; it in fact accepts the 'philosophy' of the west. It matters little that a 'fringe' of this élite calls itself leftist, socialist or even communist.[16]

Later, commenting on the significance of the Iranian revolution under Khomeini, Siddiqui observes:

> The Islamic movement in Iran is the only Islamic movement in modern times that has openly, clearly and unambiguously identified kufr in all its dimensions, including the local instruments of kufr, the westernized élite who were nominally Muslim. All shades of kufr have been identified, from nationalism, the nation-State and political parties, to capitalism, feudalism, modernism, and the western culture of nakedness, free will and liberal values.[17]

Thus, while Gandhi sought to liberate the West (and India) from modern civilization, Khomeini sought to liberate Islamic civilization from western culture. Both however would have agreed that the elaborate development effort to turn the people of post-colonial societies into second or third rate Europeans or Americans was an unmitigated obscenity.

On the other hand, the westernized ruling classes of the South that Siddiqui identifies did find the development project attractive, and were stimulated adequately to pledge the entire resources within their political power for this quest. But precisely because such unwanted idealism has not elicited an echo in the masses of their countries, development has been incapable of developing roots and has therefore remained essentially unstable. The period of obsession with the development project proved nearly fatal—but global consciousness is already now yearning for an alternative. One of the motivations for this change has been the discovery that the westernization of world culture would mean in effect universalizing the phenomenal poverty of today's western culture itself (particularly its more powerful American extreme).

For the South, the instability of development programmes is a turning point. A few decades may yet pass before the forces behind world development are ready to acknowledge and concede that the people are getting increasingly unresponsive to their thrusts, but the period of disloyalty has been inaugurated.[18] A few years ago, a mesmerized and civilizationally alienated élite would have fumed at the prospect of dismissing the West as a model for their post-colonial societies; today's generation will think otherwise. Future politics will also acknowledge the lively resurgence of the South's traditions, genes, creativity and skills. Since these are not part of

the heritage of modern science, they may not exude unacceptable violence. The South may have to eject or be cured of a good deal of what it has inherited from the West over the past 200 odd years. Jalal Al Ahmad described the condition of the South in terms of a new disease he called 'occidentosis, a plague from the West'.[19]

Modern Science, Science and Ahimsa

If modern science is actively associated with violence, and via development, with plunder and triage, then the question that was asked in relation to development at the commencement of this chapter could also be repeated here: What is the alternative? Is a critique of modern science a rejection of knowledge? Can one be against knowledge?

Knowledge is a prerequisite for the functioning of the human species; it has been an active component of the human personality ever since the human species found that the instinctual basis for its behaviour had weakened due to changed circumstances (a thesis developed at length in *Homo Faber*). I make however a sharp distinction between western science and earlier sciences (civiliżational science). The older sciences were linked organically with their cultural sources and this linkage *prevented* their being used for violence. Since knowledge was integrated within culture, culture could temper, guide and even restrain science. It was impossible to separate knowledge from its cultural moorings; it was even more difficult to know where knowledge ended and culture began.

The claim of modern science to a universalism independent of culture (and cultures) is the first instance of its kind. Philosophers however admit that the concerns and interests of what passes off today as modern science are closely linked to the political objectives of western culture, but with one major difference: it is not apparent even now whether it is the values of modern science that drive western culture or the other way around. For all practical purposes, however, modern science is nothing more and nothing less than western science, a special category of ethno-science. In fact, its too readily assumed universalism has had disastrous consequences for other ethno-sciences.

Consider, for instance, the development of different ethno-sciences before the globe was sought to be forcibly integrated

under one cosmological doctrine and timetable. The integration generated corresponding distortions in the historiography of science. Other ethno-sciences and their understanding of natural events were considered mere 'anticipations' of the ideas later resumed and transformed by western science.

Let me elucidate the distinction between modern science, which pretends to operate a system independent or outside the framework of culture, and the older systems of understanding and expertise, which cannot be understood apart from their culture of origin, and which demand fidelity to the dominant values, symbols and framework of their specific cultures. The best illustration of this is available in the way different cultures have approached disease, medicine and health.

What is today known as modern medicine is almost wholly associated with allopathic practice and its philosophy of treating illness by counteracting the symptoms of illness. Thus, if high blood pressure is a manifestation of disease, anti-hypertensive drugs are administered to the suffering patient; if serious inflammation occurs on the surface of the body, anti-inflammatory medications are applied. The human body is not seen as an organic system, but as composed of independent parts, some of which, if diseased, can even be replaced. Curing often involves invasive techniques and the use of coercive, violent, instruments. For this reason, as a system, allopathy is often reported to cure the disease, but kill the patient. [20]

In fact, because of its dependence on methods of diagnosis and treatment which are obsessively technological, allopathy is closely related to the increase in the incidence of iatrogenic illness.[21] It cannot emerge from its mass-kill approach to bacteria, and it must ignore the patient's own recuperative powers and the immunological strengths with which nature has endowed him during centuries of interaction with the environment.

Ayurveda, one of India's medical systems, is not really speaking a system of treating illness or disease, but a theory and practice of maintaining health. It therefore emphasizes nutrition and diet. Disease is defined as dis-equilibrium. The body suffering disease may not be overpowered with active drugs alien to the system. The techniques used by the physician should do no more than aid the body to return to its original state of balance where disease, by definition, ceases to exist. Most of ayurveda is unintelligible outside the cultural framework of Hindu culture.

Likewise, acupuncture is part of a medical system unique to China. Modern science has attempted to explain, unsuccessfully, acupuncture in terms of modern neurology. It has also been unable to explain how a valid, effective technique originated outside the framework of modern science. Giri Deshingkar observes that during the Cultural Revolution 'many Chinese attempted a theoretical explanation of acupunctural anaesthesis which was based on the traditional Chinese theory of "qi" flowing through twelve meridians as well as on the principle of dialectical interaction between forces in the human and animal bodies.'[22]

Neither ayurveda nor acupuncture can be understood apart from or outside of their cultural context. Modern science's normal tendency is first to ignore these systems of knowledge. Often it is willing to ignore or help destroy them without even a proper investigation of their validity. But sometimes it may also forage in them, colonising a few scattered techniques, leaving the cultural components aside, as its cause-and-effect reductionism inhibits its acceptance of other interpretations.

Now this can have wholly undesirable consequences. It has reduced ayurveda, for instance, to the status of an antiquated system, its valid insights usurped piecemeal even while the rest of its philosophical baggage is dismissed as nothing more than meaningless gibberish. Similar exercises have been carried out with acupuncture. However, a really good illustration of what can happen, if any is required, is available in the work of Fritjof Capra, which deals not so much with medicine as with physics.

Fritjof Capra's first successful book, *The Tao of Physics*, published a decade ago, created an intense feeling of euphoria among us 'orientals'. It seemed as if a lottery ticket we had invested in centuries ago was suddenly and unexpectedly called out for a prize. According to Capra, theoretical physicists from the West, returning bewildered from the unfamiliar terrain of the quantum world, and stumbling for a vocabulary and pictures to describe the new landscape, had found a way out by relying on the concepts and images that crammed the speculative texts of the Hindus and the Chinese Taoists.

Premonitions of some of these connections between modern science and eastern mysticism had appeared even before Capra sought to notice them in his grand way. Einstein, for example, had been attracted to the Indian metaphysics of Jagdish Chandra Bose.

Oppenheimer, Heisenberg, and Schroedinger had mumbled vague vedantisms from time to time, to describe the awesome and audacious worlds they had created with their mathematical models.

In his second book, *The Turning Point*, Capra continued the themes taken up in the *Tao of Physics*.[23] He began *The Turning Point* with an obituary of the classical physicist's approach to nature, and in the analysis effectively interred Descartes, Newton and Galileo. But he cautioned that the ghost of a mechanical world picture continued to prevail in biology, psychology, medicine, and economics, where he found reductionism triumphant. His principal aim was to show the negative implications of policies and therapies based on such reductionist science.

Thus, we have a biology without reverence for life, psychology without a psyche, medicine militating against health, economics with little common sense, and populations desperate for relief from the tyrannies of modern science.

On the other hand, Capra observed, if one looked at the scene carefully, one saw emerging a new vision capable of transcending the reductionist swamp. As evidence, he drew attention to the new 'systems' view of life, mind and consciousness, holistic methods of health care, alluring integrations of western and eastern psychotherapies and new paradigms in technology and economics.

This new vision, he added, was also profoundly ecological. It incorporated the demands of feminism, and was spiritual in its core. It was bound to lead to profound changes in the organization of society and politics. Significantly, wrote our physicist, reiterating what he had said in the *Tao of Physics*, this new holistic vision came closest to the metaphysics of non-western cultures.

This last proposal opened up for Capra honours of another kind. In 1980 India's academic papacy, the University Grants Commission (UGC), invited him to India to deliver the Sri Aurobindo Memorial lectures. A major Indian philosopher, Sri Aurobindo, had in the 1940s attempted a grand synthesis between (Darwinian) evolutionary theory and Indian metaphysics. The invitation to Capra basically implied that 'Western science' was once again being invited to testify to the prophetic 'modern' qualities of 'Eastern wisdom'. Self-certification has recently not been our strong point: the foreign stamp of approval is still considered superior. The West certifies knowledge as legitimate or valid for the East more than forty years after the reported ending of

colonialism. A new orientalism discovers features of the East that the East did not even recognize it possessed before!

At this juncture it might be instructive to discuss Sri Aurobindo's own contribution to the themes Capra addresses. In Aurobindo's time, evolution was the reigning fashion of the scientific world. With great self-confidence, and rooted firmly in Indian thought, the sage of Pondicherry made an impressive attempt to incorporate the evolutionary hypothesis within an Indian metaphysics of knowledge and experience.[24] Earlier, the Indian physicist Jagdish Chandra Bose had attempted a similar fusion of discoveries and insights from India and the West but failed.

It is important to emphasize that for both Aurobindo and Bose, the integrity of Indian metaphysics was never in question. After their departure, however, the State-sponsored legitimacy that western science acquired in the Indian subcontinent led to a rapid devaluation of important constituents of the Indian tradition. The arrogance and influence of science-believers and scientific-temper propagandists, provided a further excuse to dismiss Indian metaphysics as insolently as Macaulay had done a century earlier, labelling it superstitious, irrational and evil. (Gandhi's was the first major effort to raise the dignity of indigenous thinking.)[25]

Capra's effort differs from Aurobindo's in this significant sense: his base is not in Indian tradition, but in western science. He does not reject western science but continues to hold modern physics as a reasonably valid theory of knowledge. But, like Aurobindo, his effort is to relate Indian thought once again to a dominant obsession of his time—this time, subatomic physics. Is Indian thought dignified or degraded as a result of the exercise? Should it feel flattered? Aurobindo's efforts to marry western evolutionary theory and Indian metaphysics produced an end result that was unrecognizable as either modern evolutionary theory or as Indian tradition: it soon became extinct.

While Sri Aurobindo's effort did not harm evolutionary theory, it endangered Indian metaphysics by surrendering the latter's claim to transcendent truths in exchange for the dubious distinction of being fashionable and relevant to a specific scientific theory at a particular period of time. A critique of Capra must proceed along similar lines. Indian metaphysics ought not to be conflated with a seventeenth-century ethnocentric methodology. The values of both are incommensurable.

In his Indian lectures (published as *The New Vision of Reality*), Capra resumes the claims and content of his two earlier books.[26] He begins by introducing three major ideas: first, he says, the notion that we cannot decompose the world into independently existing, final, indivisible units (a notion of modern physics) is not alien to Indian or Chinese traditions, both of which teach that it is the *relations between things* that constitute the real identity of things. Capra quotes atomic physicist, Henry Stapp: 'An elementary particle is not an independently existing unanalyzable entity. It is, in essence, a set of relationships that reach outward to other things.' Compare this, Capra says, with what Nagarjuna has said: 'Things derive their being and nature by mutual dependence and are nothing in themselves.'[27]

The second idea concerns relativity theory. When mystics intuit reality, says Capra, they seem to cross over into the fourth-dimensional reality of Einsteinian space–time. However Capra does not explain how we can be certain that reality has only four dimensions, or that the experience of mystics can be limited to such a four-dimensional reality. The Pakistani scientist Abdus Salaam has recently suggested for example that the unification theory may eventually demand the assumption of a thirteen-dimensional real world. Finally, a 'dimension' is an analytical tool, a mental construct. Do such constructs mean anything to mystics at all?

In his third proposal, Capra dwells on the dance of Shiva. Modern physics proposes the notion of a continuous and dynamic interplay of primal forces manifest in the creation and destruction of subatomic particles/events. This is precisely what the mythic dance of Shiva, the simultaneous Creator and Destroyer of the world, symbolises. With such impressive evidence, Capra concludes: 'We can say with considerable confidence that the ancient wisdom of the East provides the most consistent background to our modern scientific theories!'[28]

Having presented his great theses, Capra next goes on to introduce another set of related ideas. He poses the 'systems' view of nature against the reductionist dogma patronized by modern science until the recent revolution in physics. The 'systems' approach, he observes, is also closer to the organic perspectives of most Eastern traditions towards nature, or reality.

A closer examination, however, will show that the dichotomy

that Capra introduces between the 'systems' or 'holistic' approaches on the one hand, and reductionism on the other, is a false one. *Holism itself is a category of the mind.* The mind is an inadequate (some would also say, imperfect) instrument incapable of matching the capacities of intuition, mysticism or nature. In non-western cultures, in fact, the mind is methodologically barred, and rightly, from being the primary epistemological medium: it is considered secondary, a status that accords well with its instrumental nature. Unless this is recognized, fundamental errors will result. A mystic distrusts reason, recoils from discrete phenomena, resents separation. More important, mysticism claims to encounter the ultimate directly, a claim from which science must methodologically forever bar itself.

For Capra, holism on the one hand and reductionism on the other, are different points of the same spectrum. 'We can see', he writes, 'reductionism and holism, analysis and synthesis, are complementary approaches.'[29] Thus, according to him, the systems view is not *against* the reductionist view: it merely makes up for the latter's deficiencies. It does not displace reductionist knowledge, but uses it.

But this of course is nonsense. *Both* reductionism and holism are constructions of western science. Claims that the systems approach is a better scientific approach and is similar to the organic view of life of the eastern philosophers, involves reducing mysticism to an understanding articulated by the analyzing mind. The so-called mystical or metaphysical qualities of eastern traditions have one feature in common: they are ascientific or, better still, trans-science.

'It is possible', continues Capra, 'to use a "bootstraps" methodology in a systems' approach'; to integrate various systems studies into a coherent method, so that they are internally consistent and provide an approximate understanding of reality or processes.

However, the mind is itself part of the bootstrap. It must obtrude on any efforts to approximate the whole because of its total dependency on presuppositions or assumptions. The mind cannot work without assumptions, which in their turn must always distort reality. The West's effort to theorize without assumptions, from Descartes to the phenomenologists, have ended either as nightmares or failures. We have shown earlier how modern science in fact operates under its own set of assumptions.

What Capra is proposing in his 'complementary' solution to the crisis in modern science is in effect a totalitarian hypothesis. On the one hand he has what to his mind is a reasonably reliable interpretation of reality, fabricated by the scientific method. On the other, eastern traditions seem to be in agreement with the scientific world picture of today. Capra is not only providing a new view, but attempting to articulate a *final picture of the world.*

Falling for the same temptation years earlier, Aurobindo laid the grounds for the rapid obsolescence of his own philosophy. In a few decades from now our understanding of reality will be different from what it is now. When this occurs, science, which maintains its right to modify and update itself without compromising its alleged truth value, will continue to thrive while the eastern traditions will suffer the consequences of being considered obsolete.

Capra's enterprise should be refused legitimacy by us for this one reason alone. The Indian tradition has always ignored the claims of the analytical mind to achieve integral images of reality. Capra is overruling that same tradition when he proposes that the results of analytical thinking in modern science equal the direct intuition of Indian (or Chinese) philosophers. In this sense, his disservice to India is greater than he, or even the U G C, realize. His analysis offers a final onslaught on the transcendent qualities of Indian metaphysics—by rooting them in the parochial perceptions of our scientific era. The cosmic dance of Shiva will be frozen, like any figure in bronze, its timeless, enchanting imagery transfixed because it has been made to relate to a temporary, temporal understanding.

Finally, the attempt to bring western science and eastern tradition in agreement is an attempt to improve science. The metaphysical bleakness of science encourages constant foraging in other traditions. In that sense, Capra is merely a modern scientist in a fresh phase of colonization. For whenever science is locked in a dead end, it scouts for a way out; to do this it may sometimes overpower other epistemologies by simply incorporating them.

We have noted how this has happened for instance in the encounter between western medical science on the one hand and ayurveda and acupuncture on the other. Elements from the latter systems were sought to be taken over, while the rest was discarded—their cultural frameworks were shelved on the grounds that these were meaningless and inessential. Modern science in fact

has never overtly respected either mysticism or the insights of non-western cultures.

The crisis today is a crisis of modern science desperately looking for a human metaphysic. It is not a crisis of Indian tradition: the latter hardly requires certification. (What it does require is political space).

As Capra undertakes to examine and treat a basically western pathology from a western standpoint and method, he can only provide false solutions. False prophets can prescribe only false therapies.

In 1492, Christopher Columbus set out to discover a sea route to the East Indies. Landing on the American island of San Salvador, in his delirium Columbus thought he had finally discovered India. Actually he had discovered another world, mistaking it for the East. Capra's voyage does not seem to be any different from Columbus' voyage in what it claims it has achieved for itself.

More promising than Capra's and less dubious is the recent Islamic effort to relate critically to modern science. Some of the more articulate voices in this effort include Ziauddin Sardar, S. Parvez Manzoor, M. Iqbal Asaria, Gulzar Haider, and others. Their effort was once collectively represented in the now-defunct magazine *Inquiry*. Recently, Sardar edited a remarkable volume on this subject, entitled *The Touch of Midas*.[30]

The rallying point for the work is the ecological crisis facing the planet, the contribution of modern science to the crisis, and Islam's potential mediatory role in it. Since the dictates of Islamic consciousness demand of its believers 'personal responsibility for the moral ordering of the natural world', the present ecological crisis, write the new Islamicists, has made Islam a particularly relevant ethical tradition for our times. However, Sardar and his colleagues also discuss what should be the more specific Islamic response to the phenomenon of modern science itself.

There is very little disagreement among Islamic scholars that a death instinct has taken hold of modern science, turning it into an inexhaustible source of instruments for the destruction of nature. As a consequence the public image of science and the credibility of its experts has been irreversibly damaged. Parvez Manzoor speaks of 'a heightened awareness of the somber aspects of modern science from its facile patronization of a highly lethal weaponry to its imperious disregard for social responsibility.'[31]

It is instructive to contrast this destructive contribution of modern science with the use of knowledge in the Islamic renaissance. Parvez Manzoor writes how 'in the early years of Islam, the environmental ethic permeated the entire Muslim society, as can be seen from such products of Muslim technology as irrigation schemes, the physical layout of classical Islamic cities like Fez, Sana'a and Isfahan, and the arts and crafts of that age.'[32]

Science in Islam functioned harmoniously within a broader framework of social and ethical values. What is known distinctly as Islamic science not only produced valid and useful knowledge, it proved to be also intensely creative.[33] Islamic science flourished for instance in the theory and practice of built environments, and such knowledge, as the noted architect Hassan Fathy has documented, has been widely dispersed.

Parvez Manzoor is emphatic that within the Islamic perspective 'the debasement of nature by man leads to his own debasement and amounts to a revolt against the Creator.... In fact, the Muslim respect for nature is so deep that scholars like Hossein Nasr have argued that the development of technology under Islam was deliberately stifled when technology became a threat to the natural environment.'[34]

Yet, environmental devastation has affected the Islamic countries as badly as it has the rest of the planet. The blind and uncritical import of deeply flawed western technology made possible largely due to the alienation of Islamic leaders from their religious culture and from their own roots in the land produced environmental devastation right across the spectrum of the Muslim–Arab world.

In the circumstances, can Islam provide the required restorative in the present Dark Age, as it once did in a similar dark period in western history? 'Can a synthesis be achieved', asks Sardar, 'between the growing awareness of a crisis in science in the West and the various attempts to rediscover the spirit of Islamic science in the Muslim World.'[35]

Much of the answer to that question depends on the approach of Islamic scholars to modern science as a valid body of knowledge. An additional question we can ask is whether this exercise will eventually benefit western science or Islam. Is a synthesis possible that could benefit both? Will the import of such science and technology not prove to be a Trojan Horse for Islam, driving it—as

it already seems to be doing—along an increasingly narrow path determined by the West for the West? We already have the example of Fritjof Capra and Indian metaphysics before us.

What is not yet conceivable is whether the present crisis can be solved by paradigm improvements or by an eclipse of Galilean science and thus, a transformation of the nature of science itself. But while there is doubt about what should constitute the 'new science' for the West, this is not a problem with Islam. Science in Islam cannot function outside a framework of Islamic values.

Islamic scholars claim that lack of knowledge (ignorance) is abhorrent in Islam. The Koran favoured a general empirical attitude which engendered in its followers a reverence for nature. But unlike in modern science, there can be no pursuit of knowledge for itself in Islam: knowledge is to be acquired for an understanding of God and for solving the problems the Muslim community faces. The pursuit of knowledge is important for understanding the *ayats*, the signs of God, and therefore, for understanding Him. 'In a truly Islamic milieu', declares Manzoor, 'propounding hypothetical theories of man as a complement to the Koranic understanding of man would be unthinkable.'[36] The Prophet took a decision to ban astrology, for instance, not on the grounds that it was not a valid field of knowledge, but because He felt that its potential to mislead was greater.

Ziauddin Sardar enunciates an interesting set of concepts that must inform the goals of any Muslim society's approach to science. Not only do these concepts constitute the basic values of an Islamic culture, according to him they form the parameters within which an ideal Islamic society develops and progresses. They also embrace the nature of scientific enquiry in its totality. He identifies ten such concepts: *tawheed* (unity), *khilafah* (trusteeship), *ibadah* (worship), *ilm* (knowledge), *halal* (praiseworthy) and *haram* (blameworthy), *adl* (social justice) and *zulm* (tyranny), *istislah* (public interest) and *dhiya* (waste).

Giving an example, he writes: 'Scientific and technological activity that seeks to promote *adl* is *halal*, while that science and technology which promotes alienation and dehumanization, concentration of wealth in fewer and fewer hands, unemployment and environmental destruction is *zalim* (tyrannical) and therefore *haram*.'[37]

Equally forcefully, Manzoor argues that *sharia*, the parameters of Islamic law and ethics, can be translated into environmental codes

and actions. The theory of Islamic science and environment as portrayed in the *The Touch of Midas* is clearly impressive and bold.

However, we should note that Islamic scientists in the past gave answers which were not posed in the uni-dimensional manner of analytical and quantitative science, but rather via an art form of quality and symbols. To imagine such a science is not easy for those steeped in contemporary ways of seeing science.

Seyyed Hossein Nasr has warned repeatedly that traditional Islamic science is not limited in scope or meaning as is the modern discipline with the same name. In his new book, *Islamic Science*, he writes:

> The Islamic sciences, even in the more limited sense considered here, which exclude the religious and many branches of the philosophical sciences, are considered at one with the world of nature, of the psyche and of mathematics. Because of their symbolic quality, they are also intimately related to metaphysics, gnosis and art, and because of their practical import they touch upon the social and economic life of the community and the Divine Law which governs Islamic society.[38]

This is the opposite of modern science, which is reductionist and secular, without direction or symbol, exceedingly specialized (tunnel-vision) and compartmentalized, and for that reason so distorting as a meaning system that a perspective of the whole is a logical impossibility.

A synthesis may not be meaningful or even desirable in such circumstances. We have seen the hopeless consequences such an approach can harvest when we considered the case of Indian metaphysics and western science. As Parvez Manzoor graphically puts it in the case of Islam, what we may get is not really synthesis, but 'con-fusion'. Western science is not interested in synthesis, for, by definition, it has always claimed the primacy of all epistemologies.

Islam on the other hand has always been driven to synthesize. Historically, Islam has had two other great synthesizers or Teachers besides the Prophet: Al-Farabi and Mir Damad. They have reconstituted the Islamic hierarchy of knowledge in times of epistemological stress, given order to the sciences and classified them. The task of the future fourth teacher is formidable. He runs the risk of being digested by an all-powerful scientific method, rather than being able to subdue it for a higher purpose. The result to be looked forward to is whether in the encounter Islam will survive at the expense of modern science.

Chinese Science

Giri Deshingkar, one of India's Sinologists, has recently investigated whether under Mao and the Cultural Revolution a separate Chinese science was emerging within the changed, intellectually turbulent circumstances of the period.[39] He believes that such a case could be made out. In recalling the work of Nathan Sivin and A. C. Graham (also Sinologists), he notes that a small but growing number of researchers are studying Chinese scientific theories in terms of Chinese categories of thought. He comments:

> Such an approach establishes the Chinese tradition in science and technology as a distinct and viable system of thought. It no longer remains an inferior version of or a prehistory of modern science. It does not 'anticipate' later European discoveries but goes its own way. It does not become a victim of 'uneven historical-development'; it has its own independent internal dynamic. External ideas, even cosmologies (e.g.Buddhist) are absorbed and internalised with confidence.[40]

Mao Zedong, observes Deshingkar, had little sympathy for bourgeois science and technology and the attendant institutions of the modern scientific establishment. He sought to replace it with a proletarian science and technology 'which would strike a different path from the "metaphysical", "idealist", and "bourgeois" science of the West and of the Soviet Union after Stalin's time.'[41] Deshingkar, however, warns that one should not therefore proceed to conclude that Mao Zedong was on 'a quest for alternative non-western science.' Mao saw his effort as 'the only true science', yet the theory would remain unmistakably Chinese. 'Since this experiment combined Chinese native practice and dialectics ostensibly according to Marx and Engels, but with a strong Daoist (Taoist) substratum, the resulting theory was bound to be different.'[42]

In essence Mao was merely reinstating the earlier Chinese tradition of integrating science with morality, a preoccupation of Gandhi and others. For his plans he relied on the Chinese masses and repudiated the primacy of professional science and technology personnel. His people would generate science in factories and fields. This new effort could not be said to have failed; Deshingkar suggests that it was merely aborted by the new dispensation in power after Mao Zedong's death. Now it lies submerged.

If we examine in greater detail these examples of the reaction

against bourgeois science, we can conclude that the future remains pregnant with other possibilities. One is not really concerned with whether they are successful or not. Till today, as Deshingkar admits, none of the efforts to sidestep the hegemonistic universalism of western science has succeeded.

The fact, however, that efforts continue to be made in this direction indicate that it is a fundamental quest, and this is hope enough. It is important to recall that for most of human history, human civilization has survived and produced art outside the perceptions of modern science and that the twin oppressions of modern science and development are after all only a few centuries old. Change is inevitable in the direction we suggest. This book itself is launched with the aim of strengthening the idea of culture as satyagraha, and for restoring the civilizational idea as the channel to liberation in a world dominated by uncivilized capital.

Notes

CHAPTER 1

1. Gustavo Esteva, 'Regenerating People's Space', *Alternatives*, Delhi, Vol. XII, No. 1, January 1987, p. 135.
2. Meadows et al., *The Limits to Growth*, Universe, 1972.
3. G. Hardin, quoted in B. Commoner, *Ecology and Social Action*, pp. 25–6. Should the reader think the concept of triage is a thing of the past, he should read a 'letter to the editor' of IDRC Reports (Vol. 17, No. 2, April 1988). The letter suggests that the countries of the North should forgive debts, but should tie further aid to population control. It ends thus: 'Nevertheless, I don't think foreign aid should be abandoned—as some claim—but actually increased on a more realistic scale for countries which initiate real and efficient population control. The others, after their present debt has been cancelled, *should be left to their fate*.' (Emphasis added).
4. See W. Morehouse and A. Subramaniam, *The Bhopal Gas Tragedy*, CIPA, New York, 1988, for a comprehensive account of what occurred at the Union Carbide plant. There are numerous other accounts, but this still remains by far the best. See also, David Weir, *The Bhopal Syndrome*, IOCU, Penang, 1986, for a record of potential Bhopals around the globe.
5. *The Bhopal Tragedy—One Year After*, APPEN, 1985, contains numerous revealing interviews with victims and doctors on the aftermath, particularly regarding problems of medical relief. See also C. Alvares, 'Bhopal Six Years Later', *Third World Resurgence*, Malaysia, No. 5, January 1991.
6. Term used by the Japanese to describe surviving radiation victims of the Hiroshima and Nagasaki atomic bombing.
7. Quoted in *State of the Environment: 1984–85*, Centre for Science & Environment, New Delhi, p. 246. Referred to hereafter as CSE Report II.
8. See Calestous Juma, *Pesticides and the Hungry*, Environment Liaison Centre, Nairobi, 1981.
9. Foo Gaik Sim, *The Pesticide Poisoning Report*, IOCU, Penang, 1985, p. 23. See also, Bob Wyrick, 'US Made Poisons Hurt More Than Just Pests', Part II, *Newsday*, 14 December 1981.
10. C. Juma, 'Pesticides and the Hungry'. See also his *Poisoning the Poor*, ELC, Nairobi, 1981.
11. David Dembo, Ward Morehouse and Lucinda Wykle, *Abuse of Power*, New Horizons Press, New York, 1990, states that in a review of 65,000 of the most commonly used chemicals in the US undertaken by the National Academy of Sciences, the Academy came to the conclusion that little or nothing was known of 90 per cent of them. As for pesticides the situation was worse.

12. C. Alvares, 'The Fate of the Earth', *The Illustrated Weekly of India*, 30 December 1984.
13. 'Operation Faith' was the code name given by the Madhya Pradesh government to the detoxification drama involving the remaining MIC (methyl isocyanate) in the Union Carbide plant, carried out under the direction of Indian scientists.
14. 'For years, the literature arrived at the analytical conclusion that a missing factor or tool, or the perverse, corrupt, or inefficient use of something could explain the damage done by development to people and their environment' (Esteva, 'Regenerating People's Space', p. 136).
15. Stanley Adams, *Roche Versus Adams*, Jonathan Cape, 1984, p. 85.
16. C. Alvares, 'Climax of a Hazardous System', *Inquiry*, London, February 1985. Also reproduced in *APEN*, Penang, Malaysia, March 1985.
17. Esteva, 'Regenerating People's Space', p. 135.
18. See B. Inglis, *Poverty and the Industrial Revolution*, London, 1971, for a detailed account.
19. Reissued as *Decolononizing History: Technology and Culture in India, China and the West, 1492 to the Present Day*, The Apex Press, New York; Other India Press, Goa, 1991.
20. K. L. Kedia & A. Sinha, *Roots of Underdevelopment. A Peep into India's Colonial Past*, Varanasi, 1988.
21. See the article by Henry F. Dobyns, *Current Anthropology*, Vol. 7, No. 4, 1966, pp. 395–449.
22. R. T. Takaki, *Iron Cages: Race and Culture in 19th Century America*, Athlone, 1979. Takaki gives revealing examples throughout.
23. C. Alvares, 'Development Against People', *Development Forum*, Geneva, July 1978.
24. E. Haribabu, *Integration of Human Settlements in India: Towards a Contextual Model*, I.I.T., Kanpur, 1983, p. 1.
25. Bureau of Rural Development, *Artisans in Wardha Block*, Sewagram, Wardha, 1979, p. ii.
26. R. C. Dutt, *The Economic History of India*, Vol. I, Delhi, 1973 (Reprint).
27. The text of the Technology Policy may be found as an appendix in Industrial Development Services, *Contributions of Handicrafts and Handlooms to Indian Development*, Product Review Paper 3, Delhi, 1983.
28. Ibid.
29. L. C. Jain, *Textile Policy Set to Annihilate Employment in the Woollen Cottage Sector*, IDS, Delhi, 1983.
30. For the complete text of the new policy, its aims and objects, see *The Financial Express*, 7 June 1985.
31. Dastkar, *Implications of the 1985 Textile Policy*, Delhi, 1985.
32. Darryl D'Monte, *Temples or Tombs?* CSE, New Delhi, 1985, p. 257.
33. Bureau of Rural Development, *Artisans in Wardha Block*, p. 80.
34. Ibid., p. ii.
35. Ramesh S. Bhatt, *Problems of the Management of Bamboo Resources in Tamilnadu*, Bombay Natural History Society, 1982.
36. Ibid., p. 58.
37. Ibid., p. 38.
38. See the *State of the Environment Report*, CSE, Delhi, 1982, p. 27. For other detailed reports on the pollution caused by the OPM, see *Environmental Planning*, Shahdol, 1981, pp. 178 ff., and R. Keshwani, 'Tragedy of the Sone', *Economic and Political Weekly*, 26 July 1986.

39. Cinemart Foundation, *Scenario of the 7 Per Cent*, Vol. II, Delhi, 1985, pp. 38–9.
40. H. S. David, *Victims of the Miracle: Development and the Indians of Brazil*, Cambridge University Press. See also W. McNeill, *Plagues and Peoples*, Anchor, 1979, p. 222.
41. G. Joshi, 'Forest Policy and Tribal Development: Problems of Implementation, Ecology and Exploitation', in *Social Action*, Vol. 31, October–December 1981, p. 446. See also C. von Fuerer-Haimendorf, *Tribes of India: The Struggle for Survival*, OUP, Delhi, 1982.
42. E. Goldsmith and N. Hildyard, *The Social and Environmental Effects of Large Dams*, Vols. I & II, London, 1984. See also *World Rivers Review* (formerly *International Dams Newsletter*).
43. A. Yagnik, *The Narmada Project: Development for Whom?*, SETU, Ahmedabad.
44. Further information on the Narmada Dam is available in C. Alvares and R. Billorey, *Damming the Narmada*, APPEN/Third World Network, Malaysia, 1988.
45. *Scenario of the 7 Per Cent*, Vol. II. The book also documents several cases of abuse of tribal environments by large industrial units including the Bailadilla Iron Ore Project, the ACC Cement Factory in Jhinjpani, Western Coal Fields, Roro Asbestos Mines etc.
46. Pat Mooney, *The Seeds of the Earth*, 1980. See also his 'Law of the Seed: Another Development and Plant Genetic Resources', in *Development Dialogue*, 1983: 1–2 and 1985: 1.
47. E. Hong, *See the Third World While it Lasts*, Consumers' Association of Penang, Malaysia, 1985.
48. H. Abdulali, 'On the Export of Frogs' Legs from India', *Journal of the Bombay Natural History Society* 82 (2), 23 September 1985, for a detailed discussion.
49. See the report 'Nutrient Drain', CSE Report II, p. 20.
50. For a fuller discussion, see Chapter II below.
51. For a fuller discussion, see Chapter II below.
52. M. Raman, 'Third World Exhaustion of Resources by the First World: the Historical and Current Situation', Consumers' Association of Penang, 1984, provides a useful overview. See also *Third World: Development or Crisis?*, Third World Network, Malaysia, 1985.

CHAPTER 2

1. N. Lakshman, 'Hunger', *The Illustrated Weekly of India*, 26 January 1986.
2. J. K. Bajaj, 'Green Revolution: A Historical Perspective', *PPST Bulletin*, Vol. 2, No. 2, p. 98.
3. Ibid., p. 106.
4. Rolando B. Modina and A. R. Ridao, *IRRI Rice: The Miracle That Never Was*, Aces Foundation, the Philippines, 1987. See also C. Alvares, 'The Last Days of IRRI?', *Inquiry*, Vol. 3, No. 3, pp. 32–3.
5. C. Alvares, 'The Great Gene Robbery', *The Illustrated Weekly of India*, 23 March 1986. See also Burton Onate, 'IRRI Seeds: Threat to National Security', *Journal of Appropriate Technology*, Aces Foundation, the Philippines.

6. C. Alvares, 'The Great Gene Robbery'.
7. J. K. Bajaj, 'Green Revolution', p. 93.
8. Ibid.
9. Bharat Dogra, *Poverty, Development and Poverty: India—1947–84*, Delhi, 1984, p. 141.
10. C. T. Kurien, *Dynamics of Rural Transformation: A Study of Tamilnadu: 1950–1975*, Orient Longman, New Delhi, 1980.
11. J. K. Bajaj, 'Green Revolution', p. 108.
12. Quoted in *Operation Flood: Development or Dependence*, A Cite Publication (CED), Bombay, 1982, p. 2.
13. Shanti George, *Operation Flood*, OUP, New Delhi, 1985, has three excellent chapters on indigenous breeds and the development of crossbreeding in India.
14. *Exotic Cross Breeding of Cattle in India*, Report of the Expert Committee, Akhil Bharat Krishi Goseva Sangh, Bombay, 1979.
15. Ibid., p. 99.
16. M. Halse, *Operation Flood: A Study*, National Dairy Development Board, 1976, p. 55.
17. C. Alvares (ed.), *Another Revolution Fails*, Ajanta Publications, Delhi, 1985.
18. See ibid., pp. 55–6.
19. Indian Dairy Corporation, *Annual Report*, 1985.
20. L. K. Jha and others, *Report of the Evaluation Committee on Operation Flood II*, Ministry of Agriculture, Government of India, 1985, pp. 49–53.
21. C. Alvares, *Genes and the Environment: The Genetic Basis of Some of our Environmental Problems*, Parisar Annual Lecture, World Environment Day, Pune, 1985.
22. B. S. Baviskar in C. Alvares (ed.), *Another Revolution Fails*, pp. 232–3.
23. Shanti George, *Operation Flood*, p. 292.
24. J. Kurien, *Social Factors and Economic Organisation of the Traditional Small-Scale Fishermen of India*, CDS, Trivandrum, 1978. See also J. Devraj, *Keel Hauling of Traditional Fisheries*, ICSSR; and T. R. Thankappan Achari, *Purse-Seining in Kerala—a Critical Appraisal*, PCO, Trivandrum.
25. J. Galtung, *Development from Above and the Blue Revolution: the Indo-Norwegian Project in Kerala*, PRIO Publication, No. 2–12, IPRI, Oslo.
26. C. Alvares, 'The Social Forestry Con Game', *Deccan Herald*, 11 November 1981. Also published as 'A New Mystification', *Development Forum*, January–February 1982. The two CSE Reports also carry detailed discussions on the subject.
27. V. Shiva, H. C. Sharatchandra and J. Bandyopadhyay, *Social, Economic and Ecological Impact of Social Forestry in Kolar*, IIM, Bangalore, 1981.
28. B. V. Krishnamurti, *The Deteriorating Eco-Economic Scene in South Mysore* (1981), Environmental Services Group, WWL, Delhi.
29. See CSE, *Citizens Report II*, pp. 51–71.
30. Shiva et al., *Social Forestry in Kolar*, p. 77.
31. Ibid., p. 46.
32. See the report of the Group constituted to evolve guidelines for grant of tree-pattas/leases, Ministry of Agriculture and Rural Development, 1985.
33. V. Shiva, 'Coming Tragedy of the Commons', *Economic and Political Weekly*, 12 April 1986.

CHAPTER 3

1. C. Alvares, 'Science, Colonialism and Violence: A Luddite View', in Ashis Nandy (ed.), *Science, Hegemony and Violence*, Delhi, OUP, 1988.
2. C. Alvares, *Science, Technology and the Future of Human Rights*, Delhi, Committee for Cultural Choices and Global Futures, 1986.
3. R. Ramasubhan, *Public Health and Medical Research in India* (Sarec Report), 1982.
4. C. V. Seshadri, *Development and Thermodynamics*, MCRC, 1982.
5. C. V. Seshadri and V. Balaji, *Towards a New Science of Agriculture*, MCRC, p. 4.
6. Ibid., p. 5.
7. Ibid., p. 7.
8. Quoted in D. Poleszynski, *Food, Social Cosmology and Mental Health: The Case of Sugar*, United Nations University, HSDRGPID–59/UNUP–324, p.8.
9. Ibid., p. 1.
10. Ibid., pp. 8–9.
11. Ibid., p. 40.
12. Ibid., p. 9.
13. Ibid., p. 12.
14. Ibid., p. 16.
15. C. V. Seshadri, *Special Symposium on Social and Cultural Impacts: Microbiology of Food*, Helsinki, GIAM VII, 1985, p. 4.
16. Ibid., p. 10.
17. Poleszynski, *Food, Social Cosmology and Mental Health*, p. 23.
18. Ibid., p. 46.
19. Ibid., p. 48.
20. Quoted in C. Alvares, 'Idli: Saving Grace', *The Sunday Herald*, 25 September 1988.
21. See C. V. Seshadri, *Microbiology of Food*, p. 17.
22. See C. Alvares, *India's Rural Technology Experiments: A Critique*, CORT, Delhi, 1984.
23. J. Cottingham (ed.), *Bottle Babies: A Guide to the Baby Food Issue*, ISIS, 1976. See also UNICEF, 'Infant Feeding Practices', *Readings in Infant Feeding Practices*, No. 4, Winnikoff & Baer.
24. A. Berg, *The Nutrition Factor*, New York, The Brookings Institute, 1973.
25. See J. Cottingham, *Bottle Babies*, p. 12
26. F. W. Rosa, 'Breastfeeding and Family Planning', *PAG Bulletin*, 5 March 1975.
27. See Vimal Balasubramanyam, *Contraception As If Women Mattered*, Bombay, CED, 1986.
28. M. Fukuoka, *One-Straw Revolution*, Friends Rural Centre, Rasulia, 1985, p. 18.
29. V. Shiva and J. Bandyopadhyay, *Forests in India's Heritage*, Research Foundation for Science, Technology and Natural Resource Policy, Dehra Dun, 1985.
30. For a detailed account of anti-people forestry management in India, see *PPST Bulletin*, Vol. 3, no. 1 (1983), pp. 31–113.
31. A historical micro-level study of the issue is available in Ramchandra Guha, 'Forestry and Social Protest in British Kumaun 1893–1921', included in Ranajit Guha (ed.), *Subaltern Studies*, Vol. IV, Delhi, OUP, 1986, pp. 54–100.
32. National Commission on Agriculture, Part IX (Forestry), 1976, p. 71.
33. M. Gadgil, Prasad and Rauf Ali, *Forest Management in India: A Critical Review*, 1982, Centre for Theoretical Studies, I.I.Sc., Bangalore.

34. For a critical assessment of the contributions of the scientific community towards saving Silent Valley, see D. D'Monte, *Temples or Tombs*, pp. 29–89.

CHAPTER 4

1. I am grateful to the historian Dharampal for bringing this quote to my attention.
2. Ashis Nandy, *The Intimate Enemy*, OUP, Delhi, 1980, pp. x–xi.
3. Ibid., p. xi.
4. See the discussion in C. Alvares, *Decolonizing History*, pp. 138 ff.
5. Esteva adds: 'And what "development" connotes is always, at least, one thing: escaping from a vague, unspeakable, undignified condition called *sub-desarrollo* or underdevelopment, a term which was invented by Harry Truman on January 10, 1949 ... to diagnose a particular misery which affected most human beings and communities outside the United States.... He used it to designate a social condition that almost anybody might claim to be in, without having to identify with the personal stain that it leaves on the majority to which it refers. But he used it as a name for that which was un-American, that even anti-Yankees would recognize as something undesirable' ('Regenerating People's Space', p. 144).
6. For a more complete discussion of these 'development theorists', see C. Alvares, *Homo Faber*, pp. 1–17.
7. G. Meier and D. Seers, *Pioneers in Development*, World Bank and OUP, Delhi, 1984.
8. G. Meier, *Emerging from Poverty: The Economics That Really Matters*, OUP, Delhi, 1984.
9. Meier and Seers, *Pioneers in Development*, p. ix.
10. Ibid., p. 19.
11. G. Rosen, *Western Economists and Eastern Societies*, OUP, Delhi, pp. 52–3.
12. In Meier and Seers, *Pioneers in Development*, p. 52.
13. Ibid., p. 90.
14. See Rajni Kothari, *State Against Democracy: In Search of Humane Governance*, Ajanta publications, 1988, for a detailed presentation of the idea.
15. Ibid., p. 231.
16. Ibid., p. 357.
17. G. Meier, *Emerging from Poverty*, p. 23.
18. Ibid., p. 33.
19. Ibid., p. 13.
20. Ibid., p. 28.
21. W. Bellow et al., *Development Debacle: The World Bank in the Philippines*, 1982.
22. Iqbal Asaria, 'What Hope for Third World Masses?' CAP, Penang, Malaysia, 1984; Cheryl Payer, *The Debt Trap: The International Monetary Fund and the Third World*, 1974.
23. United States Treasury Department, *Assessment of US Participation in the Multilateral Development Banks*, Washington, 1982.
24. E. Goldsmith, 'Open Letter to Mr Clausen, President of the World Bank', *The Ecologist*, Vol. 15, No. 1/2, 1985, p. 4.
25. See Ibid., No. 5/6, 1985; see also ibid., Vol. 17, No. 2/3, 1987.

26. 'Development implies that one has started on a road that others know better, to be on one's way towards a goal that others have reached; to race up a one-way street' (G. Esteva, 'Regenerating People's Space', p. 144).
27. '"We" were educated to believe in the illusion of being able to master time. In exchange, we were persuaded to lose interest in mastering space, which was then occupied by all and therefore by no one' (G. Esteva, 'Regenerating People's Space', p. 147).
28. E. Goldsmith and N. Hildyard, *Large Dams*, p. 18.
29. 'Being the owners of our space is what "we" are all about. This, it seems to me, is what Indians, peasants, and "marginals" have been trying to do. In their space they carry out their projects, which are nothing else than to lead their own lives. They have dreams and hopes and they know quite well what the consequences of their actions are' (G. Esteva, 'Regenerating People's Space', p. 147).

CHAPTER 5

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15. In Ranajit Guha (ed.), *Subaltern Studies*, Vol. IV, OUP, Delhi, pp. 54–100.
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17. M. A. Waheed Khan, 'Chir: A Techno-Economic Evaluation', *Scenario of the 7 Percent*, Vol. II, p. 58.

18. Sahabat Alam Malaysia, *Environment, Development, Natural Resource Crisis in Asia and the Pacific.*, 1984, pp. 253–76.
19. S. R. Ramaswamy, 'People's Response to Desertification in Karnataka', Paper presented at seminar on Control of Drought, Desertification and Famine, organised by INTACH, New Delhi, May 1986. See also Writ Petition No. 9851 of 1986 dated 18 June 1986, in the Karnataka High Court, and the press statement, 'Court Intervention Sought for Saving Village Common Lands', Mannu Rakshana Koota, Bangalore. A complete story is now available in Sadanand Kanvalli, *Quest for Justice*, SPS, Dharwad, 1990.
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35. 'The Bakun Project', International Dams Newsletter, Vol. I, No. 1.
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42. Ibid., p. 125.
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51. I. Illich, *Deschooling Society*, Penguin, Harmondsworth, 1973.
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53. Ibid., pp. 29 ff.
54. Ibid., p. 39.
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56. Ibid.
57. Christopher Hill, *The World Turned Upside Down*, 1975.
58. I. Illich, *Shadow Work*, p. 108.
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60. Ibid., p. 58.
61. Jai Sen, *The Unintended City*, Calcutta, 1976.
62. Esteva outlines a parallel perception: 'The damage to the peasant economy and culture, which was a by-product of the Green Revolution, forced many peasants to emigrate. In the cities, already congested by the demographic explosion (also created by "development"), they did not find the promised land. Very few of them were able to secure even a livelihood; instead they became social atoms, as they were placed in a very low position in the homogenized and hierarchical world that defines urban life. They, thus, became the true "marginals" in every conceivable sense. Many of them, however, drew upon their tradition as a survival strategy. They recreated, in the city, physical and cultural spaces—the *barrios*—and maintained links with their original communities. And so they were able to resist the permanent threat of urban development, which attempts to replace the living and lively social entities that the *barrios* are with homogenized and specialized spaces to sleep, work, buy, or use free time, enveloped by the speedways which are created for cars and not for men and women.' ('Re-generating People's Space', p. 136).
63. Other anti-development thinkers would include Dharampal, the PPST School in Madras, which brings out the *PPST Bulletin*, and Majid Rahnema. Edward Goldsmith, Editor of *The Ecologist* has now added his own voice to the group with his book, *The Great U-Turn: De-Industrialising Society* (Green Books, London, 1988).
64. Fukuoka, *The One-Straw Revolution*.
65. Ibid., p. 15.
66. Ibid., p. 158.
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CHAPTER 6

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2. C. Alvares, *Decolonizing History*, p. xv.
3. Esteva writes: 'Interestingly enough, we are immediately asked to produce an alternative strategy. That is certainly not our enterprise. We are opposed to any attempt by the "alternative" establishment to grant the notion of development a new lease of life through new labels: "alternative", "another", "humane", development. Indeed we get incredulous looks when we say that all these forms of "alternative" development are nothing but a deodorant to mask the stink of development' ('Regenerating People's Space', p. 137).
4. A. Nandy, *The Intimate Enemy*, p. 75.
5. F. Capra, *The Turning Point*, Flamingo.
6. M. Sahlins, *Stone Age Economics*, 1972; R. Clarke and G. Hindley, *The Challenge of the Primitives*, 1975.
7. S. Marglin, 'To Gain the Whole World', Harvard, 1981.
8. C. Alvares, *Decolonizing History*.
9. K. Buchanan, 'The Worlds of Different Peoples', *IFDA*, No. 55.
10. Clarke and Hindley, *Challenge of the Primitives*, p. 10.
11. S. Marglin, 'To Gain the Whole World', p. 3.
12. Dharampal, *Indian Science and Technology in the 18th Century*, 1971.
13. Esteva, 'Regenerating People's Space', p. 139.
14. Ibid., p. 145.
15. Ibid., p. 140.
16. K. Siddiqui (ed.), *Issues in the Islamic Movement (1983–84)*, Kuala Lumpur, 1985, p. 7.
17. Ibid., p. 8.
18. Esteva writes: 'While the Western project appears to have been successful it is far from being fully implemented. Some of us have even begun to suspect that it has already failed, that historically it is exhausted and dead' ('Regenerating People's Space', p. 141).
19. Jalal Al-I Ahmad, *Occidentosis: A Plague of the West*, Mizan Press, Berkeley, 1984.
20. See Kothari and Mehta, *Cancer* and *Death*, for a devastating assessment of the efficacy of modern medicine.
21. Illich, *Medical Nemesis*.
22. G. Deshingkar, 'Science and Technology in China: A Framework of Analysis', *China Report*, XXI (1985), pp. 9–10.
23. F. Capra, *The Turning Point*.
24. C. Alvares, 'Sri Aurobindo: Superman of Supertalk?', in *Quest*, Vol. 93, January–February 1975.
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30. Z. Sardar (ed.), *The Touch of Midas*, Manchester University Press, 1984.
31. Ibid., p. 151.
32. Ibid., pp. 161–2.
33. Ibid., p. 60 ff.
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35. Ibid., p. 3.
36. Ibid., p. 236.
37. Ibid., p. 8.
38. S. H. Nasr, *Islamic Science: An Illustrated Study*, London, 1976, p. xiii.
39. G. Deshingkar, 'Science and Technology in China'.
40. Ibid., p. 16.
41. Ibid., p. 14.
42. Ibid., p. 15.

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ISBN 0 19 563281 8

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